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NEWS DIGEST

Domestic

Piasecki Helicopter Corp., forced to look for a new name because of the recent resignation of board chairman Frank Piasecki announced today that it has found one—the Vertiplane Corp. The Morton, Pa., firm's board of directors also called for a special meeting of shareholders for Oct. 27 to approve the change. Stockholders will be asked at the same time to approve the addition of two members to the current 11-man board—Thomas K. Finletter, former Secretary of the Air Force and John T. Floberg, former Assistant Secretary of Navy for Air. Frank Piasecki has founded a new company of his own which is known as the Piasecki Aircraft Corp.

First nonstop scheduled tourist flight from New York to Los Angeles at $80 one way fare was made by Trans World Airlines Super Constellation on Sept. 26. Service is combination tourist first class. TWA is scheduling nine westbound and nine eastbound multiple service Super-G flights on domestic routes.

Nuclear Development Corp. of America, will build a reactor "critical" facility at its Nuclear Experimental Station in Dutchess County, N. Y., to study the effect of structural components on reactor critical mass, efficiencies of various fuels and to determine the best operating conditions for various neutron systems. Work on the $400,000-plus facility will begin in late fall.

New record land speed of 1,280 mph. has been set by an unmanned rocket sled over the 4.1-mi. supersonic research track at the Naval Ordnance Test Station, Chino Lake, Calif. Previous record for an unmanned sled—set on the 10,000-ft. track at Edwards AFB earlier this year—was 1,100 mph. New mark was made during a routine test, according to Navy scientist W. D. Drinkwater.

Homer E. Strickler, 41, manager of American Airlines news services and editor of Flagship News, died Sept. 26th after a long illness.

Financial

Flying Tiger Line reports sharp gains in earnings in last six months of its 1954-1955 financial year ending June 30. The carrier showed a $400,188 net income as compared with a loss of $425,545 the preceding year. Profit was earned despite a decline in gross operating income from $18,642,919 to $15,363,289. Major factor in the gain has been heaviest contract operations since the Korean war, with revenues running about $1.5 million monthly.

Delta Air Lines, Inc., formerly known as Delta C&S Air Lines, has called for redemption of the final $2,575,100 outstanding of its 5½% convertible debentures (subordinated) on Oct. 27. This year the airline has called a total of $10,575,100 in debentures due May 1, 1973 issued in exchange for Chicago & Southern Air Lines stock at the time the two firms merged May 1, 1953.

Republic Aviation Corp. has declared a 50-cent dividend on common stock payable Oct. 21 to holders of record Oct. 7.

National Airlines reports $3,057,778 net profit for its 1955 fiscal year ended June 30, on operating revenues of $48,616,468, highest in the airline's 21 years. NAL has declared a regular 24-cents quarterly dividend payable Oct. 14 to holders as of Oct. 4.

International

Pan American World Airways reports cargo traffic increased by 59% during the first five weeks of its new reduced trans Atlantic rates. During the period—Aug. 15-Sept. 17—the carrier flew 687,969 lb. of freight. The airline is adding a sixth all-cargo flight to its schedules to handle increased business.

McDonnell Convertiplane Exceeds 180 mph.

McDonnell XV-1 convertiplane has been clocked at over 180 mph., beating the previous record for helicopter type aircraft of 156 mph. recorded by turbine-powered Sikorsky XH-39. The mark was set on the XV-1's initial flight Apr. 29th at Smartt Field, St. Louis, Mo. The XV-1 has been developed for the Army by USAF's Air Research and Development Command. This view shows a variation in the fairing atop the rotor pylon, which appears to bulge slightly compared with the smooth appearance of the fairing shown in initial photos.

Proposal to produce Folland Gnat light fighters in India at the government's Hindustan Aircraft Factory is being studied by Indian officials.

International air traffic transactions settled through the IATA Clearing House, London, increased by 25% during the first half of this year, as compared with the same period in 1954. Total turnover $159,963,000. Interclearance with U. S. Airlines Clearing House totaled $6,934,276 in first half of 1955, a 35% increase over same period last year.

British Overseas Airways Corp. will equip its 10 Douglas DC-7Cs on order with storm warning radar made by the Radio Corporation of America.

Pay increases of three percent will be given some 3,000 office and design workers of Avro Aircraft, Ltd., and Orenda Engines, Ltd., Toronto, Canada, retroactive to May 1 under a new contract signed with AFL Machinists Union. New contract does not affect the firms' 11,000 production workers.

Three Vickers Viscount 805s have been ordered by Fred Olsen Airtransport Ltd., Norway, bringing total orders for 800 series Viscounts to 36 and total Viscount (of all series) orders to 239.

AVIATION CALENDAR

Oct. 7—Escape from High Performance Aircraft Symposium, sponsored by Institute of Transportation & Traffic Engineering Ext. at U.C.L.A., Aeronautical Engineering Assn., Institute of the Aeronautical Sciences, IAS Building, Los Angeles.

Oct. 11-14—National Association of State Aviation Officials, annual convention, Dallas.

Oct. 11-15—Society of Automotive Engineers, Golden Anniversary Aeronautic Meeting, Aircraft Production Forum and Aircraft Engineering Display, Hotel Statler, Los Angeles.

Oct. 17-21—National Metal Exposition, Convention Hall, Philadelphia.

Oct. 17-21—National Safety Council, 43rd National Congress and Exposition, La Salle and Conrad Hilton Hotels, Chicago.

Oct. 17-21—International Air Transport Assn., 11th annual general meeting, Waldorf-Astoria Hotel, New York.

Oct. 18—Massachusetts Second Aviation Conference, Fitchburg, Mass.

Oct. 18-19—Seventh annual Aerial Dusting and Spraying Conference, sponsored by the Washington State Aeronautical Commission and the State College of Washington, Wenatchee, Wash.

Oct. 20-21—Sixth annual National Noise Abatement Symposium, Armour Research Foundation, Chicago.

Oct. 24-25—Institute of Radio Engineers Professional Group on Electronic Devices, first annual Technical Meeting, Shoreham Hotel, Washington, D.C.

Oct. 25-27—Technical Conference on Aircraft Electrical Applications, American Institute of Electrical Engineers, Hollywood Roosevelt Hotel, Los Angeles.

Oct. 26-28—Southwestern Airport Managers Assn., annual meeting, Greenville, S.C.

Oct. 27-28—Aircraft Electrical Society, 12th annual display, Pan Pacific Auditorium, Los Angeles.

Oct. 30—Second annual Topeka Aviation Day, Topeka, Kans.

Oct. 31-Nov. 1—Institute of Radio Engineers 1955 East Coast Conference on Aeronautical and Navigational Electronics, Lord Baltimore Hotel, Baltimore.

Oct. 31-Nov. 2—Society of Automotive Engineers, Golden Anniversary Transportation Meeting, Chase Hotel, St. Louis, Mo.

Nov. 2-4—Society of Automotive Engineers, Golden Diesel Engine Meeting, Chase Hotel, St. Louis, Mo.

Nov. 3-4—Institute of the Aeronautical Sciences and Canadian Aeronautical Institute, second annual joint meeting, Chateau Laurier, Ottawa, Ont., Canada.

Nov. 5-10—National Aviation Trades Assn., annual convention, Hotel Westward Ho, Phoenix, Ariz.

Nov. 9-10—Society of Automotive Engineers Golden Anniversary Fuels & Lubricants Meeting, Bellevue-Stratford Hotel, Philadelphia.

Nov. 9-11—Industrial Management Society, 19th annual time, motion study, management clinics, Hotel Sherman, Chicago.

PICTURE CREDITS

17—Eastfoto, 18—Temple Press Ltd., 24—Levy-Slupp, 27 (bottom)—Butler Green.

WHO'S WHERE

In the Front Office

G. Lawton Johnson, president of Greer Marine Corp., subsidiary of Greer Hydraulics, Inc. **Edward M. Greer**, president of Greer Hydraulics, named chairman of the board of Greer Marine.

James M. Darbaker, president of Copperweld Steel Co. **Frank R. S. Kaplan** elected chairman of the board of directors, **Henry G. Riter** elected honorary chairman of the board and chairman of the finance committee.

William H. Schrader, vice president-finance of Servel, Inc.

C. George Dandrow, vice president-customer relations, Johns-Manville Corp.

Ralph C. Moffitt, assistant vice president & purchasing director of United States Steel Corp.

Col. B. L. Anderson resigned as vice president of Philippine Air Lines to become vice president of Sonano & Co., Manila. He will continue as a member of the board of directors of PAL.

Peter H. Stanton, vice president-treasurer, Topp Industries, Inc.

William A. Mann, commercial vice president, General Electric Company.

C. L. Peterson, vice president-general manager of Brown Instruments Div., Minneapolis-Honeywell Regulator Co.

Darius R. Barber, controller of Brush Electronics Co., Cleveland.

R. W. Moore, Sr. and **George C. Neal** elected directors of Emery Air Freight Corp.

Laurance S. Rockefeller elected member of the board of directors of Olin Mathieson Chemical Corp.

Honors and Elections

Edward P. Schuman, president of Bogue Electric Manufacturing Co., Paterson, N. J., named recipient of 1955 Air Power Trophy—highest award of the Air Force Association, New Jersey Wing.

John Tyler and **E. C. Perry, Jr.**, of United Aircraft Corp. will be presented the SAE Manly Memorial Award at the Society of Automotive Engineers' Aeronautic Meeting, Oct. 11-15 in Los Angeles.

Richard E. Fisher, American Airlines, named Chairman of the Air Transport Association's Public Affairs Committee.

Changes

John R. Wiley, aviation director of The Port of New York Authority, **Marshall D. Kochman**, deputy director of aviation.

Andrew Kalitinsky, manager of nuclear research and development at Convair, Fort Worth.

Walter Trefz, technical service director of Micro Lube Sales, Dallas.

William H. Oswald, Jr., aircraft sales manager of L. B. Smith Aircraft Corp., Miami, Fla.

James B. Case, marketing manager of H. M. Harper Co., Morton Grove, Ill.

J. E. Sullivan, manager of Washington, D.C. office, Lear, Inc.

(Continued on page 83)

INDUSTRY OBSERVER

►General Electric's J-79 engine is scheduled for two forthcoming North American Aviation designs. These are the long range interceptor and fighter-bomber aircraft for which North American recently was awarded Phase I contracts.

►Navy plans to equip a light cruiser with the Talos antiaircraft guided missile. Talos has a longer range than the Convair Terrier now installed on the Navy's first missile cruisers, Boston and Canberra. The Talos is being manufactured by Bendix Aviation Corp. with the power plant by McDonnell Aircraft Corp. and guidance system by Radio Corp. of America.

►Convair officials have recently reported that the F-102A, supersonic USAF fighter currently in production, will be 50% built through subcontractors.

►Northwest Airlines has purchased a Gilfillan Quadradar ground control approach set for installation at Shemya in the Aleutians along its Great Circle Route to Japan. Northwest is reopening the Shemya refueling base, formerly operated by USAF, to shorten its North Pacific Route to Tokyo. Northwest now uses Thomborough AFB in Cold Bay, Alaska, as its stopping point.

►Royal Air Force is reconsidering its order for Vickers V. 1000 jet transports powered by the Rolls-Royce Conway turbofan engine. RAF is budget trimming to concentrate its funds on combat types. British government-owned airlines may take over the V. 1000 transport order if RAF bows out. Prototype C. 1000 is now nearing completion at Vickers Weybridge plant.

►North American Aviation's F-107, designed for Mach 2 speeds will be powered by a Pratt and Whitney J-75 engine.

►Carmody Corp. delivered its first F11F-1 procedure trainer (AW Mar. 28, p. 58) to the Navy on schedule and before regular production aircraft were delivered.

►Northrop officials recently visited Germany to interest both German manufacturers and the new German air force in their lightweight delta fighter design.

►Bell Aircraft Corp. experimental VTOL has made 20 vertical flights, eight horizontal flights and one through complete transition. Bell test pilot Dave Howe has made all of the VTOL flights.

►Sale of Canadian Car & Foundry Ltd., Montreal and Fort William, to A. V. Roe (Canada) Ltd., Toronto appears assured, with 87% of the shares of Canadian Car & Foundry having been deposited for sale to A. V. Roe (Canada) Ltd., at $30 a share. Canadian Car & Foundry has subcontracts for the Grumman S2F anti-submarine aircraft being built by de Havilland Aircraft of Canada, Toronto, for the Royal Canadian Navy, and also Beech T-34 trainers for the Royal Canadian Air Force. The company also builds buses, railway stock, and other heavy industrial items. A. V. Roe (Canada) Ltd. is expanding its operations which now include Avro Aircraft Ltd., Orenda Engines Ltd., and Canadian Steel Improvements Ltd., all of Toronto.

►Defense awards to small business firms increased 24% during July over the same month last year. The small firms received in July a total of $184 millions in contracts, net value of all defense procurement was reported at $639 million.

►The supersonic Chance Vought XF8U-1 Navy fighter is equipped with a Marquardt ram air emergency power package (AW Apr. 25, p. 53). The unit supplies sufficient electrical and hydraulic power to maintain flight control and communications in the event of an inflight emergency such as a flameout or failure of the main alternator.

Washington Roundup

Air Force Exposion

The Air Force campaign to expand its goal of 137 wings gained momentum when Gen. Thomas D. White, USAF Vice Chief of Staff, said that a larger goal may be necessary to match Russian military air progress.

This followed a line established by USAF Chief of Staff Gen. Nathan F. Twining when he told the Air Force Assn. in August, "We all know that a 137-wing Air Force is not a permanent solution to our air power needs."

White told a meeting of business leaders in the Pentagon that if the Soviet Union continues to make gains in quality, the U. S. may have to think more about matching their quantity. He said that while the Soviet Union now has thousands more combat planes than the United States, American aircraft are superior. But he warned that if Russian aircraft continues to improve, we may have to think of matching their numbers.

Hanaman to Depart?

Watch for R. Karl Honaman to quietly depart from his Pentagon censorship post before the year's end and return to his former job at Bell Laboratories.

MiGs for Egypt?

Reports that 100 MiG-15 fighters are involved in the arms purchase deal between Egypt and Czechoslovakia added fresh worries to the British and American governments which are seriously concerned over maintaining a balance of power between the Israeli and Egyptian forces.

The MiG-15, which is superior to the Gloster Meteor jet fighter now used by both air forces, would give Egypt an overwhelming airpower advantage.

In Washington, the State Department said it was "highly doubtful" that Israeli would be permitted to purchase American jet fighters such as the North American F-86 Sabre, to counter the Egyptian move with western aerial arms.

Observers said the deal was made between Egypt and Czechoslovakia because the Reds offered easy financing terms, including a barter deal for Egyptian cotton in exchange for the arms.

Congressional Airline Studies

Members of the House Commerce Committee are traveling the globe to study air transportation during the congressional recess.

Three members of the committee are going to Manila to attend a regional conference of the International Civil Aviation Organization on "The Facilitation of Air Travel." They are Rep. Torbert MacDonald (D-Mass.), Rep. Don Hayworth (D-Mich.), and Rep. John Beamer (R-Ind.).

Other members of the committee are traveling to Europe, via the Polar route of Scandinavian Airlines System, to discuss jet and local service airliners with British, French and Scandinavian experts. Originally, the main purpose of the trip was to attend the ICAO meeting at The Hague, but this concluded before the committeemen left the U. S. Members of the European trip are: Rep. Oren Harris (D-Ark.), Rep. Charles Wolverton (R-N. J.), Rep. John Williams (D-Miss.), Rep. Joseph O'Hara (R-Minn.), Rep. Peter Mack (D-Ill.), Rep. Isidore Dollinger (D-N. Y.), Rep. Morgan Moulder (D-Mo.), Rep. Steven Derounian (R-N. Y.), and Rep. Walter Rogers (D-Tex.).

Big Defense Contractors

The Senate Preparedness Investigating Subcommittee, headed by Sen. Lyndon Johnson (D-Tex.), will release a series of reports—starting this week—dealing with the 100 biggest contractors for the Department of Defense—most of which are aircraft or related manufacturers. Later reports will analyze the volume of business that has gone to specific segments of defense contractors.

Democrats on Defense

A preview of points Democrats will stress in challenging the Administration's defense policies was given by Sen. Stuart Symington (D-Mo.):

- A showdown in the next Congress on the relative U. S.-Soviet air strength will conclude that the Department of Defense has presented an optimistic picture without basis in fact.
- There has been no economy, except in defense, Symington protests that since 1953 the Administration has made cuts of $8 billion in defense, but increased other government expenditures by almost $4 billion.
- Disarmament hopes of the world lie in U. S. military strength, since Reds respect power—and power only.

CAB Protests

Civil Aeronautics Board has vigorously protested the prospect that airlines be put on their own to compete with other forms of transportation. CAB's Chairman Ross Rizley expressed concern that this might follow under legislation proposed by the Cabinet Committee on Transportation in a letter to Sen. Warren Magnuson (D-Wash.), chairman of the Senate Commerce Committee. It greatly strengthens the emphasis on "competition" in transportation policy.

"We do have in air transportation a large number of domestic trunk carriers which are very well developed and which we believe are capable of meeting any competition which other forms of transportation may offer," Rizley declared. "On the other hand, in the field of local service and helicopter transportation there are segments that are still in the developmental state. Any new policy which required, directly or indirectly, rate pricing based on actual current costs would destroy them because they are still in need of substantial subsidy from the federal government."

British Reprisal?

Great Britain is preparing a set of special conditions on U. S.-built commercial aircraft imported by the British. The requirement is reportedly similar to that imposed on the British Vickers Viscount by the Civil Aeronautics Administration, although Great Britain denies any connection between them.

Discussions have been held, but no details of the conditions have been revealed. The requirements will apply to piston engine aircraft but not to jets. The British advised the U. S. to come back for more information if an American firm sells a jet transport to a British customer.

—Washington staff

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Navy Aircraft Buying Faces Investigation

F3H-1 contract touches off Senate, House inquiries; Congress inclined to place blame with Navy.

By Katherine Johnsen

Washington—Two congressional investigations have been started into the aircraft procurement policies of the Navy over the past few years resulting in contract cancellations of more than $1 billion and costing the government several hundred million dollars in termination charges.

Both investigations—the most recent was begun last week—were started because of the Navy's program for the McDonnell F3H-1.

Under the program, the Navy is paying more than $67 million for 56 planes, costing approximately $1,350,000 each including spares, which will be used primarily for the ground training of mechanics. The planes, powered by a 7,200 lb. Westinghouse J40 engine, were originally ordered as all weather carrier-based fighters.

The investigations are being made by the Senate Preparedness Investigating Subcommittee, headed by Sen. Lyndon Johnson (D-Tex.), and by the House Military Operations Subcommittee, headed by Rep. Chet Holfield (D-Calif.). The Senate investigation was requested by Sen. Stuart Symington (D-Mo.), former Secretary of the Air Force. The House investigation was asked by Rep. Frank Kirsten (D-Mo.).

Facts on F3H-1

Here are the facts on the F3H-1:

- **Of the 56 F3H-1 planes ordered by the Navy,** six crashed in tests, killing two pilots. Five of the crashes were in the St. Louis area.
- **Of the remaining 50 aircraft,** the Navy has decided that 21, costing $28-350,000, can be used only for ground training of mechanics or research into structural stress resulting from armament firings. These were the first F3H-1s off the production line. The cost of conversion of the aircraft for more important missions would be prohibitive according to the Navy.
- **Twenty-nine of the F3H-1s will be converted** for installation of 10,000 lb.-thrust Allison J71 engines with afterburner at a cost of $4,300,000. They are now undergoing carrier trials as an all weather fighter.

There appears to be general agreement that the basic fault with the F3H-1 Demon is that the engine ordered by the Navy, the J40 produced by Westinghouse Electric Co., cannot satisfactorily handle the airframe weight.

Questions for Navy

Congressmen, at this point, appear inclined to place blame on the Navy—rather than McDonnell or Westinghouse—for the situation.

A major point of the investigation will be to ascertain why the Navy continued production of the F3H-1, powered with the J40 for a year and a half after it should have been obvious that there was not adequate performance. The first F3H-1 was delivered in December, 1953. Production was continued by the Navy until June, 1955, despite failures in performance tests.

Westinghouse officials say that their company desired to produce a higher-powered version of the J40 for the F3H-1, but were overruled at the time by the Navy.

McDonnell officials decline comment, but are understood to have quietly and unofficially complained to the Navy about the engine furnished for the F3H-1.

BuAer Reorganization

Rep. Karsten, in his letter requesting a congressional investigation said:

"Evidence of the plane's (F3H-1) unsuitability and faulty design is demonstrated by the fact that out of the 56 which were built, six of them crashed during test flights, killing two of the pilots.

"Lack of power is not a latent defect, but rather this is one of the first things a test pilot would observe in testing an aircraft with an inadequate engine. This defect would manifest itself from the moment the throttle was opened for takeoff. It is difficult to understand why the Navy would continue to accept delivery of planes with a defect such as this which could not escape observation."

Members of the two congressional investigating committees wonder whether inter-service rivalry—an attempt to "keep up" with the Air Force—or negligent administration figured in Navy's failure to cancel F3H-1 production contract.

There is some speculation that the failure of the F3H-1 program—as well as other projects—figured in the recent shakeup of the administration of Bureau of Aeronautics (AW Sept. 5, p. 12).

F3H-2 Passes Test

The first F3H-2, successor to the F3H-1, was delivered in June, and McDonnell officials say it has successfully passed qualification trials on the aircraft carrier Ticonderoga.

R. L. Wells, executive assistant to the general manager of the Westinghouse Division at Kansas City, which produced the J40s for the McDonnell F3H-1, presented his company's position.

"When the F3H program started initially, there were two power plants under development—the J40-22 and the J40-24. The '24' was the more powerful engine and would have provided sufficient thrust to power the Demon satisfactorily.

"However, the development of the J40-24 program was cancelled by the Navy in September 1953. The J40 power plant being used in the initial Demons was the interim engine known as the J40-22. The J40-22 has always made its specified performance."

Westinghouse officials pointed out that the Douglas XF4D which was powered with the J40-22 set the world's speed record in 1953.

Navy's Position

The Navy made this formal statement on the situation:

"With the advent of the Korean invasion ... the Navy ... found its need of a modern, all-weather fighter was more pressing than ever before—and in increased quantities.

"As a result, the Navy under its original letter of intent of Oct. 3, 1951 to the McDonnell Aircraft Corp. entered into an agreement for the F3H-1 production program. On Aug. 29, 1952, this was converted to a definitive contract for procurement of 150 of this type aircraft. The basic cost of the airframe, excluding the power plant, instruments, spare parts and ground handling equipment, but including necessary tooling, amounted to $1,068,324.

"As a result of Board of Inspection and Survey trials at Patuxent River conducted on some of the first aircraft produced, it was determined that the power of the engine was insufficient for the weight of the aircraft. The aircraft thus was considered unsuitable for carrier training and operation. However, with the incorporation of several modifications to the airframe the aircraft was considered suitable as a land based transitional trainer providing the engine could be made reliable. It could not be used as a first line performer due to the lack of engine power.

"Concurrently with the Board of Inspection and Survey trials, even the contractor (McDonnell) was experiencing a series of breakdowns in the J40 engines, in most cases in test stands, at St. Louis. The engine had undergone extensive modifications many times in the past by Westinghouse and when the Board of Inspection and Survey recommended several additional expensive modifications to the airframe, it was decided that the intended use of the aircraft did not justify the additional airframe cost nor warrant the operation of the J40 engine in this specific airframe.

"At this time, since the need for an all weather fighter was still great, it was decided to modify the airframe, install the J71 engine and call the plane an F3H-2. The F3H-1 production program was interrupted at this point and changeover to the F3H-2 program begun.

As a result 90 of the 150 aircraft originally ordered were converted to F3H-2s.

"As regards the F3H-1 aircraft presently at St. Louis, it has been determined to be feasible to backfit 29 with the J71 engine. However, the cost of bringing the remainder to a standard F3H-2 configuration is considered to be prohibitive, almost equalling the cost of the new F3H-2 models. Installation of another engine is not considered practical nor economical, particularly in these early production aircraft.

"Currently the Navy plans to utilize the remaining 21 of these planes for which backfitting is deemed impracticable, for various testing purposes. These include their use in necessary and useful armament research, as well as for technical training schools for mechanics."

McDONNELL'S F3H-1 Navy headache, congressional target.

USAF Reports 52,000 Tools in Reserve

Air Force has an inventory of more than 52,000 machine tools valued at over $460 million for its mobilization reserve.

USAF's Air Materiel Command gave this breakdown:

- **There are 31,316 tools valued at $259,145,496** on contract or in the process of contract negotiations with private manufacturers.

Of this total, the major portion—27,622 tools valued at $222,595,472—are on special facility contracts. In addition, 1,262 tools valued at $8,630,910 have been let under facility lease agreements. The difference between the two arrangements: The lease agreement generally involves the letting of tools, already on hand, needed by small contractors or sub-contractors, while under the special facilities agreements, usually involving major firms and high cost tools, the private company finances the purchase. It is reimbursed by USAF and required to pay rent on the equipment. There are 1,432 tools valued at $27,529,114 let to private firms under different arrangements.

- **An inventory of 21,000 tools, valued at $210 million,** is now on hand at various sites and available to civilian contractors under on-the-spot USAF supervision. The sites are: Offutt AFB, Nebr.; Palmdale, Calif.; Eddystone, Pa.; Seward, Ohio; Detroit, Mich.; Marietta, Ga.; and Parkridge, Ill. Another site will be added next January when USAF takes over operation of an Army ordnance depot at Terre Haute, Ind.

Midge Lost in Swiss Try-Out

The Folland Midge crashed during takeoff last week at the beginning of a demonstration flight for a Swiss Army Air and Supply Department delegation considering the purchase of the plane and five others like it.

Max Mathez, the Swiss pilot at the controls, was killed when the Midge crashed into a tree near the end of the runway. All the plane parts were recovered for an investigation by the Ministry of Civil Aviation. Observers said the plane failed to clear two closely placed trees as Mathez lifted it off the ground after "a protracted" takeoff run. Earlier in the day, the Midge had completed two flights with test pilot Squadron Leader E. A. Tennant at the controls.

Martin Developing Seaplane Equipment

First of two new developments in seaplane handling equipment which Glenn L. Martin Co., Baltimore, Md., is building for the Navy will be ready for testing late this year.

This is a beaching vehicle which permits seaplanes to beach themselves under their own power. The beaching vehicle will be moored unattended near a permanent seaplane ramp. The seaplane taxis between horizontal flotation tanks and then proceeds under its own power up the ramp.

Second development is a service and drydock facility which will be ready for testing early next year. This facility will contain padded wing carts which are fastened beneath the wings and move forward with the aircraft as it enters the docking area. The dock remains partially submerged and a series of wing pads are raised from beneath to secure the aircraft. The facility will have inflatable bags submerged under the water which can raise the dock to servicing position. Hydraulic, electrical and pneumatic power will be provided for servicing and booms will be available for loading or engine change operations.

This equipment will serve as part of the seaplane force which includes support vessels such as submarine tankers, tenders and ammunition ships.

150,000 Passengers

Atlantic Summer Traffic Sets Record

By Preble Staver

Summer trans Atlantic passenger air travel set new records in 1955

An estimated 150,000 passengers flying both first class and tourist service crossed the Atlantic and returned on regular scheduled flights of the two U S international air carriers and nine foreign airlines in operation during July and August, the season's peak months, according to an AVIATION WEEK survey

Another 35,000 passengers can be added to the total with inclusion of air charter trips The latter included vacationing groups as well as transfers of military personnel and dependents

Approximately 50% of the trans-Atlantic traffic was again carried this year by two U S airlines—Pan American World Airways and Trans World Airlines The two together handled 77,843 passengers traveling to Europe and back this summer while approximately 75,000 more were shared by the scheduled foreign air carriers

Reasons for Boom

The total capacity of trans-Atlantic air service was increased about 10% over 1954 to accommodate the anticipated summer rush However, the number of revenue passengers in July and August gained an average of 20% for the trans Atlantic airlines over a year ago It was the airline's continued conversion to tourist services and increased scheduling of tourist flights that made the difference

A combination of heavier passenger loads with a maximum expansion in number of flights operated strained the capacity of the air carriers Aircraft daily utilization was constantly increased and yet the average passenger load factor for most of the overseas carriers was almost 70% The latter would seem to be optimum because of the direct imbalance of traffic

Traffic of the international airlines has been exceptionally strong beginning with phenomenal first quarter and continuing through a summer season of new records Observers see no reasons for any slackening in the remaining months of the year and predict increased profits particularly for Pan American and TWA

There is no mistaking that the general economic prosperity in the U S was the principal factor in the traffic boom The traveler was drawn to air transportation by the advantageous combinations of low cost tourist service, convenient schedule frequencies and better service and equipment The fact air fares are reasonable and the service is dependable has enabled the airlines to attract a continuingly greater share of the market

A major factor in selling trans Atlantic air travel not overlooked by traffic officials, has been the word-of-mouth selling power of passengers returning from European vacations The favorable reports spread among friends and business acquaintances has generated a substantial amount of new traffic, according to airline sales officials

Other factors contributing to the increased passenger flow last summer included an extension of the general European vacation time cycle, which coincides with the longer vacation periods now prevalent in the U S The time-payment plans also had a share in building traffic but initial reports indicate that such travel represented less than 5% of the total

PanAm Leads

Pan American was the leader in tourist operations as well as total services performed TWA came next, followed by British Overseas Airways Corp

More than 45,000 passengers flew with Pan American this summer on trans-Atlantic service and 32,000 were tourist riders Total passenger traffic of PAA was up 28% over the summer season of 1954

Pan American attributed its record to the delivery during the summer of seven new Douglas DC 7B aircraft, which carry 71 passengers

Trans World Airlines showed the most noticeable gain in tourist passengers with some 27,000 using the line's low-cost services Another 5,000 passengers crossed the Atlantic with TWA in first class accommodations TWA's summer passenger total for New York-Europe was 32,174 or an increase of 14.3% over the same period in 1954

Traffic Imbalance Continues

Among the foreign air carriers this summer the trend to more tourist services was equally pronounced BOAC, for example, scheduled a quarter of its operations as tourist flights The British flag carrier transported 12,919 intercontinental passengers to and from New York of which 7,853 went in tourist services This year BOAC substituted Boeing Stratocruisers in tourist operations and reported satisfactory results

All trans-Atlantic carriers this summer ran into the traditional imbalance of traffic common to the season There was no change in the preponderance of eastbound travelers in July and then the reverse movement during August

Traffic figures of the two U S carriers illustrate the directional nature of summer trans-Atlantic passenger traffic

Pan American's total eastbound traffic in July was 12,694 passengers—3,261 first class and 9,433 tourist—whereas its westbound movement totalled 9,873 passengers with 2,860 in first class and 7,013 tourist In August twice as many passengers flew with Pan American back to the U S from Europe as there were passengers outbound This amounted to 15,434 passengers coming to the U S compared with 7,608 departing for Europe

TWA's Experience

TWA had the same experience when in July nearly 1,000 more passengers were carried to Europe than returned with the line TWA's westbound traffic in August doubled the eastbound

The modern long range transports in operation today over the Atlantic has made non-stop crossings the standard practice with intermediate stops at Gander, Newfoundland, Goose Bay Shannon necessary only when scheduled or if the weather dictates Pan American schedules a high percentage of non-stop flights not only with its DC 7B equipment but with DC 6B's and Boeing Stratocruisers as well TWA on a weekly basis dispatched more than 15 Constellation trips nonstop from New York to either London or Paris BOAC operates New York London nonstop services, Air France between New York and Paris, and Iberia, New York Madrid

In addition to East Coast trans-Atlantic originations from New York, Boston and Philadelphia, four of the international air carriers operated overseas from the inland cities of Chicago and Detroit Through flights for Europe from both Chicago and Detroit, which avoids New York congestion, are made by Pan American, TWA, BOAC, and Air France but schedule frequencies were limited by comparison to New York. PanAm's Chicago and Detroit services have been on a daily basis, while TWA operated one round-trip weekly

One carrier only, SAS now operates from the West Coast direct to Europe via the "polar" route

TWA on Nov. 1 will become the second air carrier to offer West Coast-Europe services TWA will introduce Super-G Constellations in international service and inaugurate the first one-plane, through intercontinental service from West Coast terminals to European cities

Flight Frequency

Not only did the air carriers reach a record high in summer passenger activity over the Atlantic but in doing so flew a record number of flights Civil Aeronautics Administration reported that during July every 17 minutes, on an average, an airliner flew between the U S and Europe

A tabulation showed a total of 2,559 flights or an estimated 1,280 round trips were flown during the months Most flights were made by Pan American with 582, Trans World was next with 440 BOAC third with 228, and Scandinavian Airlines system fourth with 164

The newest airline on the trans-Atlantic route, Lufthansa of Germany, made 52 crossings

1955 Summer Passenger Trans-Atlantic Air Traffic

Selected Carriers	July 1955		August 1955		July August 1955 Total Revenue Passengers	Percentage Gain Over 1954
	Revenue Passengers 1st Class	Tourist	Revenue Passengers 1st Class	Tourist		
BOAC*	2,710	3,931	2,356	3,922	12,919	Plus 23 8
TWA	2,621	14,327	2,502	12,724	32,174	Plus 14 3
PAA	5,816	14,496	6,616	18,741	45,669	Plus 28 0
EASTBOUND U S-EUROPE						
BOAC	1,647	2,738	871	1,122	6,378	Plus 44 2
TWA	1,396	7,714	1,034	4,478	14,622	Plus 15 5
PAA	3,261	9 433	2,555	5,053	20,312	Plus 31 6
SABENA					2,883	Plus 45 5**
WESTBOUND EUROPE-U S						
BOAC	1,063	1,143	1,485	2 800	6,541	Plus 25 2
TWA	1,225	6,613	1,468	8 246	17,552	Plus 13 4
PAA	2,860	7,013	3,756	11,728	25,357	Plus 25.1

* BOAC'S figures for July are from June 26 to July 23 and for August from July 24 to August 20.
** Only Figures Available

CAA Traffic Plan Under Airlines' Fire

Civil Aeronautics Administration has delegated control of civil air traffic to the military in the Langley, Va., area over vigorous objection of the air transport industry USAF operation of a radar approach control center (Rapcon) for military traffic at Langley AFB and civil traffic at Patrick Henry Airport is scheduled Nov. 1

The CAA action was taken after many months of delay and lengthy negotiations with the Air Force Airline pilots particularly have objected to accepting military air traffic control The complaints have not, however, been aimed at the Air Force but rather as criticism of CAA for failing to assume its statutory responsibility

Industry management also has expressed alarm over the trend at CAA for "handing over its duties," primarily because it is felt the agency will continue to lose in stature before Congress First opportunity industry and the airline pilots will have to challenge CAA's proposal for military control of mixed traffic at Langley will come in about two weeks

CAA officials from Region 1 in New York are coordinating with Tactical Air Command Headquarters at Langley AFB in working out an agreement for operations in the area Industry will be invited to comment on the final agreement Scheduled airlines concerned, which operated through the Patrick Henry Airport are Capital Airlines and Piedmont Airlines Representatives from the Air Line Pilots Assn and the Air Transport Assn also will attend the joint meeting

Rapcon has been controversial since its beginning The Air Force has backed it, while CAA remained skeptical Original USAF program for Rapcon was for 54 installations in the continental U S and Alaska Air Force contends the major benefit is that it allows use of different separation criteria CAA eventually agreed to operate a total of 18 Rapcon installations to be supplied from the Air Force program but the slow progress to date has been blamed on a shortage of qualified personnel At present, CAA personnel are manning Rapcon for mixed traffic at three points, MacDill AFB, Fla; McChord AFB, Wash., and Tinker AFB, Okla, USAF has approximately nine additional installations in operation all manned by uniformed personnel who have been certified as Rapcon operators by CAA

The Air Force's Langley Rapcon installation began nearly two years ago Initial target date for an operational status was first set for February 1955 Negotiations between CAA and USAF have been in the mill since that time Even though CAA delegates civil control in the Langley area to USAF, the responsibility remains for CAA to monitor the operation for civil air traffic control

Indo-Soviet Air Pact

A commercial air agreement has been signed in Moscow between the representatives of Air India International and Aeroflot, chief administrative organization of the Soviet's civil aviation arm. The agreement confirms the possibility of a new Indo Soviet air link via Tashkent which was investigated last month in a proving flight by technicians of the Indian Airlines Corporation. The air route could halve the distance between Delhi and Moscow.

Economically-Healthy PAL Hopes To Resume Trans-Pacific Flights

Manila—The Philippine Air Lines—economically healthy once again—hopes to renew its now discarded trans-Pacific flights sometime during 1956.

PAL discontinued its trans-Pacific service as an economy move early in 1954—shortly after the inauguration of Ramon Magsaysay as president of the Republic.

During the previous administration of President Elpidio Quirino, an overall government indebtedness to the airline of $2,000,000 had been allowed to accumulate. The government is the largest stockholder. With this burden and a total capitalization of only $6,250,000, PAL found that its credit had become almost non-existent.

Therefore, company officials informed the new Magsaysay cabinet that the huge indebtedness would have to be liquidated, or the company would find itself in an untenable position. It had, the officials said, but two alternatives—retrench or shut down operations completely.

When the cabinet decided the government was in no position to pay its bill, the company retrenched by dropping all of its trans-Pacific and European flights.

Although money was the most important factor leading to the shut down, other factors contributed to the decision:

- Mexico's failure to implement its air treaty with the Philippines permitting PAL flights into Mexico City.
- The U. S. government's continued refusal to grant trans-Pacific rights via Tokyo.
- Introduction of tourist rates on Pacific routes.
- Rapid development of jet-powered and turboprop aircraft, which would make PAL's aircraft obsolete within a short time unless replaced with newer type, which would cost from three to five million dollars each.

Sound Again

It was obvious that such financing would have to come from the government but Magsaysay had been elected on a platform of economy and government leaders felt that an expensive program based upon prestige alone was bound to fail.

Today, however, the company is very financially sound. With the sale of its two DC-6 and two DC-6B aircraft for $6,413,975 with spare parts the company retired 34% of its capital stock and paid up 72% of its long-term obligation to the Rehabilitation and Finance Corporation. With reorganization, the ratio of the company's assets against liabilities rose from 78-1 to 3-1.

In the meantime the government has completely liquidated its indebtedness to the airline, and the company has a healthy surplus.

Company officials are reluctant to discuss their future plans for the simple reason that they have not yet been completely formulated. However, they do admit that their hoped-for resumption of trans-Pacific service will depend upon the line getting a government mail franchise guaranteeing them the minimum standard rate now paid for mail carriage in the United States.

Under the old agreement, PAL carried the mail, but payment for the service was negated by a clause in the law stating that payment would depend upon "availability of funds." It seemed that the government never had the funds, hence the large indebtedness which finally forced the line to cancel its trans-Pacific flights.

The company also will be faced with the problem of securing new, competitive aircraft for the long flights.

No European Flights

It was learned that the company is not planning to resume its former flights to Europe at this time, although such extension of long range flights is being left open for future consideration.

The company's short range international flights to Bangkok and Hongkong were never discontinued.

PAL officials feel that this is an opportune time to re-enter the long range international field again since the coming session of Congress, which convenes in January will undoubtedly lend a sympathetic ear.

Most Philippine politicians believe that the country lost much in prestige when the international flights to Europe and the United States were cancelled and, if the company can present a reasonable financial plan it probably will be only too glad to put Philippine flag ships back into service.

Domestic Plans

Since dropping its long range international flights the company has concentrated upon its domestic service. A new plan has been drafted calling for a main trunkline of black-top airfields extending down the length of the archipelago. These fields are being served with C-47 and Convair aircraft, while DHC Canada Otter aircraft are used on feeder lines to main points.

Under this ambitious program PAL hopes to bring aviation into the most remote areas of the Philippines. Because of the Otter's small field capabilities it is estimated that eight fields for the Canadian plane can be constructed and maintained for the cost of one C-47 field.

In Mindanao alone about 15 such fields are now being served by Otter aircraft. Other Otter fields have been opened in the central Visayan islands (Leyte and Cebu), and a few on Luzon.

Freight Plan Rejected

American Airlines' proposal for a new class of air freight service—deferred air freight—has been rejected by the Civil Aeronautics Board (AW Sept. 19, p. 139).

The Board turned American's proposed tariff down because it was lower than the minimum rate scale set by the CAB for freight carriage.

American proposed to inaugurate effective Oct. 12 a deferred freight service at lower rates than regular air freight. The new service would be slower than regular air freight service, but would be superior to ground transportation time schedules.

Advertising Trade Approved by CAB

Civil Aeronautics Board has added Hawaiian Airlines and Trans-Pacific Airlines to the list of carriers permitted to trade air transportation for advertising goods and services.

The two Hawaiian carriers are now permitted to join in the practice authorized for the local service airlines last January. The regulation expires Jan. 1, 1956.

Under the rule, a carrier must file a full description of any agreement made for an exchange. The maximum amount of transportation allowed under such agreements is $25,000.

CAB decided to extend the advertising regulation to the Hawaiian carriers in order to help them reduce advertising expenditures and cut their subsidy needs.

UAC Stock Offer

United Aircraft Corp. will offer its stockholders the right to subscribe to shares of a convertible preference stock on the basis of one share of preference stock for each 20 shares of common stock. The price of the new shares will be determined by the UAC board of directors shortly before the subscription offer is made but it will not be less than the par value of $100 per share.

Butcher's Boys:

Czech Air Force crew and formation of their Ilyushin 26 (NATO code: Butcher) light bombers which recently participated in aviation display at Ruzyne Airport near Prague. Nose detail shows upper fuselage hatch for entry to bombardier's position and general layout of the position. Pilot's canopy is hinged on right side. Armament appears to be a pair of 23 mm. cannon, one on each side of the bombardier. Note size of tail gunner position and that tail armament is not installed. Communications antenna is obsolescent type with external wire running from mast aft of cockpit to fin.

Aluminum Expansion Closed to Write-Offs

The primary aluminum expansion goal has been closed for fast tax write-offs by the Office of Defense Mobilization.

The ODM action came as aluminum capacity passed the 1955 goal set by the mobilization agency. Target capacity for this year was 1,746,000 tons. Capacity in operation, under construction and planned totals 1,778,000 tons, 32,000 tons more than the goal calls for.

Director of Defense Mobilization Arthur S. Fleming said that anticipated total capacity appears sufficient to meet current stockpiling and defense programs as well as needs of the military, military support facilities and essential civilian economy in an emergency.

Closing of the aluminum goal follows earlier ODM action which cut off rapid tax amortization for several items including commercial air transports, pending a review of the various mobilization goals.

Fleming said that present aluminum shortages exist because of unprecedented civilian demands. He described this problem as one which is obviously the responsibility of private enterprise.

The 1,778,000 tons of anticipated capacity includes 1,533,000 tons now in place, 65,000 tons being built by the Aluminum Company of America, and planned expansion of 54,000 tons by Harvey Machine Co., 60,000 tons by Olin-Mathieson Chemical Corp. and 66,000 tons by Alcoa.

Gen. Gavin Named Army R & D Chief

Lt. Gen. James M. Gavin, a strong advocate of Army aviation, has been named Chief of Research and Development for the Army.

Appointment of Gen. Gavin, former Deputy Chief of Staff for Plans and Research, indicates the strong emphasis Army is giving to the research and development field, Army Secretary Wilber M. Brucker said.

Gen. Gavin will correlate his activities with those of William H. Martin, recently named as Army's Director of Research and Development.

As the Army counterpart of that office it will report directly to the Army Chief of Staff.

BELLY DETAILS OF THE VICKERS VALIANT, medium bomber now in service with the Royal Air Force, show nose radome containing advanced model of wartime H2S bombing system. Visual bombing is done from housing just below and aft the radome. Bombardier is behind optically flat window at front of housing. Behind housing are nosewheel doors. Circular windows may be camera ports. Large bomb-bay has additional radar equipment mounted above the dielectric panel. Chutes for dropping anti-radar "window" can be seen either side of the camera ports; additional chutes are aft of the rear radar position. This production Mk. 1A Valiant features underwing, pylon mounted fuel tanks with tail fins. Fences are short and on upper wing surface only and just outboard of the auxiliary fuel tanks.

Revived Luftwaffe

Growing Pains and Indecision

By Gerald W. Schroder

Bonn—Recruiting delays and high-level indecision regarding the spawning West German air force are becoming increasingly irritating to Bonn defense planners.

The proposed air force, made possible under terms of the German peace treaty, now has about 25,000 applications from volunteers. Out of these, probably less than 12,000 will pass the rigid physical examinations and/or are young enough for service. And even some of these—notably ex-Luftwaffe pilots who will be called upon to form the nucleus of the new air force—may withdraw their applications or become ineligible before Parliament and cabinet leaders finally decide upon a firm organizational structure. As one defense planner explained to AVIATION WEEK:

"All the ex-Luftwaffe pilots upon whom we will have to depend in the beginning are now between 30 and 35 years old. And each passing month further reduces the number of eligibles.

"A lot of former pilots are solidifying their positions in industry; others have developed physical handicaps that make future service unlikely."

The reasons behind the delays in the actual enlistment of volunteers at hand and a stepped-up program to attract still more are twofold.

• **The personnel committee of the** West German Parliament is still preparing general regulations for the screening of volunteers and the appointment of senior officers.

• **The federal cabinet** has withheld final decision on the organizational structure because of Ministry of Defense criticism of certain amendments made by the upper house to the original government plan.

Meanwhile the defense planners are marking time.

Once the actual green light is received, however, an initial 600 volunteers will enter training courses under U.S. Air Force guidance—120 will train for flight instructor positions; 400 will become technical instructors; and 80 will study flight-control methods. Each of these courses will last roughly four months.

After this, the recruitment and induction of Luftwaffe service personnel will begin in earnest.

Very little is known—or has been decided—about the actual composition of the new Luftwaffe.

Original plans calling for 20 wings still stand and, under the U.S.-German military aid agreement announced last July, the Germans will receive a number of F-84Fs for their fighter bomber wings and RF-84Fs for their reconnaissance wings.

What the Germans will receive, or order, in the way of fast, up-to-date fighter planes is anyone's guess, but whatever they get, free or on loan, it won't have enough speed. One Luftwaffe planner was outspoken on this point:

"We are so terribly close to the Communist border that we will need a very light, very fast fighter plane. We will need a plane that can reach 60,000 feet in two minutes or less; a plane of 1.8 to 2 Mach. None of the planes the U.S. is now shipping abroad under NATO auspices fill this bill. The Hawker Hunter, which has been mentioned as a possible choice in the fighter field, is not fast enough, enough for us either."

Possibilities that a revived German aircraft industry might come up with their "ideal" plane, are discounted here.

But Bonn officials admit that a number of U.S. firms have sounded them out on the possibility of cooperating with the Luftwaffe. Cooperation of this type would probably begin with the establishment of U.S.-run maintenance and repair installations, then graduate to some sort of construction work on new types.

Former Lt. Gen. Adolf Galland recently made a detailed investigation of the Folland Gnat in England.

The new Luftwaffe wings will be as widely dispersed as possible to guard against surprise attack. Each squadron will have its own base. There will be six major maintenance and repair bases which will serve all 20 wings. These bases will be as far to the west as is humanly possible. Top Luftwaffe headquarters will in all probability remain at the Defense Ministry in Bonn.

First 'Official' Glance At Navy P6M

Martin Aircraft Corp. last week officially released the first pictures of the Navy's giant P6M seaplane. Previously the Navy had refused to authorize their release despite the fact that picture slides of the SeaMaster were on display at the National Air Show—an event attended by the military attaches of most foreign embassies. Subsequently, pictures of the plane appeared in Aviation Week (Sept. 19, p. 18). Official pictures show SeaMaster's plastic wingtip floats. Hydroflaps are located on both sides of hull afterbody. Fuel tanks are sealed within the wings. P6M has logged more than 25 flying hrs. since its first flight on July 14. Its dimensions: length, 134 ft.; height, 31 ft.; hull width, 10 ft.; wing span, 100 ft.; total wing area, 1900 sq. ft.; vertical tail area, 213 sq. ft. Initial flight-test pilot was George Rodnes, chief of Martin experimental flight testing.

Two Trainer Builders Join to Form New Firm

Merger of two established maintenance trainer builders was announced last week with the formation of Burton Rodgers Technical Training Aids, Inc., with plants at Cincinnati, Ohio, and Tulsa, Okla.

The new company combines firms that have been specializing in design of maintenance trainers for the military services and major airlines. President of the new firm is Paul C. Rodgers, since 1934 president of the military division of Burton Rodgers. Vice president is John H. Koch, former supervisor of training for American Airlines, who founded Technical Training Aids in 1946.

Under the merger, the Cincinnati division will continue to specialize in military contracts. It has built automated training panels, mobile training units and maintenance trainers for the Martin P5M-1 and B-57, Piasecki HUP and H-21 helicopters, Bell HSL, Convair F-102, North American F-86, McDonnell F2H-2, Grumman AF-2 and S2F-1 and Lockheed R7V-1.

Currently the plant is working on an operational trainer for the Pratt & Whitney J57-P-7 jet engine and a procedure trainer to be used for training Douglas DC-6 and DC-7 flight crews.

The Tulsa division builds panel training devices for American, United and Braniff Air Lines as well as automobile manufacturers. The company holds several patents for this type of unit.

No Tests for T-33s

Burbank—Lockheed's T-33 jet trainer has become the first peacetime-produced military aircraft to be approved for service without plane-by-plane military flight acceptance tests.

The Air Force has decided that only one of every four T-33s needs to be flight tested by USAF pilots. The other three will be accepted as ready for duty at the end of Lockheed's routine test program.

Reduced requirements for test flight will put the T-33s into service sooner and save the government about $500 on each plane—cost of an average flight test.

The new Air Force merit system also provides that the ratio may be stepped up to one in eight. If a discrepancy occurs, the sampling will revert to one in four for a proving period before returning to one in eight. The ratio could eventually go as high as one in 16 or even one in 32, the company reported.

CAB Proposes Change In Account Rules

The first major revision of regulations governing the preservation of accounts and records by airlines has been proposed by the Civil Aeronautics Board.

In a notice of proposed rule making, the CAB issued a draft release (No. 76) revising Part 249 of its Economic Regulations. A deadline of Oct. 18 was set for receipt of written comments from all interested parties.

CAB noted that the requirements for retention of records and the specified periods of retention have never been comprehensively revised.

The proposed draft rule seeks to minimize the burden of indexing and storing record. The Board was assisted by the Accounts and Records Committee of the Airlines Finance and Account Conference, which made numerous suggestions for improving the present system.

NACA Reactor Facility

The National Advisory Committee for Aeronautics will build its $4.5 million nuclear reactor facility at Plum Brook Ordnance Works near Sandusky, Ohio.

Selection of the site was made after

Nuclear Development Associates, an independent engineering firm, surveyed 18 possible locations.

The NACA reactor will be used in the study of problems related to nuclear propulsion systems. "The performance capabilities to be realized from harnessing nuclear energy for aircraft propulsion would be nonstop flight to any point on the face of the earth and return," Dr. F. R. Sharp, director of NACA's Lewis Flight Propulsion Laboratory, said. "With so large a gain the goal industry, the Atomic Energy Commission, the military services and the NACA are participating in vigorous sustained attacks on the formidable technical problems that must be solved. The new reactor will be most useful in the solution of the complex problems in which the NACA is working."

Detail design of the reactor is scheduled to be completed by the end of the year and construction contracts will follow. A staff of about 50 engineers will be located at Plum Brook.

Film Explains USAF Weapons Procurement

A 26-minute film explaining how the U. S. Air Force buys airplanes and how the weapons system concept forms a framework for procurement is available from the Air Material Command for public and corporate showings.

The Air Force Procurement Production Story" is a 16 mm., sound and color moving picture. It traces the story of a new weapons system from its inception through the Defense Department, Joint Chiefs of Staff, Air Research and Development Command and AMC to its delivery to the using command.

The picture is available to contractors and the general public. It can be obtained from the nearest Air Material Area office or Air Procurement District. Direct queries can be addressed to the Commander, AMC Directorate of Procurement and Production, Wright-Patterson AFB, Ohio.

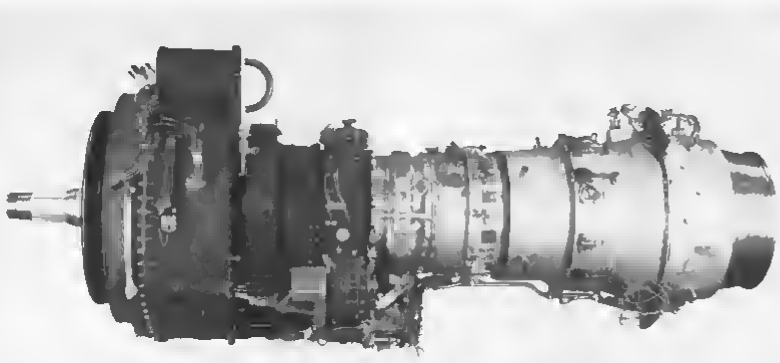
Folding Tail Saves 10 Ft.

U. S. Army Sikorsky H-34A with its normal 47 ft. length reduced for storage approximately 10 ft. by folding the tail pylon forward against the left side of the fuselage. Folded section carries the four-blade anti-torque rotor.

This space-saving feature also will be used on the commercial S-58 version of the copter which the company is offering as a 12-passenger transport with deliveries scheduled to start in mid-1956 (AW Sept. 19, p. 142).

Withdrawing pins on the right side of the tail section permits the tail to be folded over. Shaft to the tail rotor disconnects at the top of the fuselage (two circular male and female geared plugs at top of exposed portion of tail interior). Disconnecting and folding is done manually.

The Army has seats for 16 in the H-34A. The new copter weighs 11,867 lb. and carries 227 gal. of fuel. Navy has an anti-sub hunter-killer version designated HSS-1, which carries dipping sonar to detect submarines and lightweight homing weapons to destroy them.



BRITAIN'S designers are turning out excellent engines, such as the Rolls-Royce R.B. 109 above, but . . .

British Aircraft Industry:

Advanced Engines, Obsolescent Planes

By David A. Anderton

London— American airframes powered by British engines would be unbeatable.

That statement by a British engineer, echoing a U. S. Senate staff report last year (AW Aug. 9, 54, p. 12), contrasts the relative states of the aeronautical engineering art in Great Britain and the United States. Like any generalization, it can be argued against. There are excellent British airframes and excellent American engines.

But, fundamentally, it recognizes that Britain today can offer designers a range of engine types and sizes unequalled in the United States. It also recognizes that, with the possible exception of English Electric's P.1, there is not a single advanced airframe flying over Britain today.

The future prospects for British powerplants, however, never appeared brighter. In dark contrast, is the continuing stream of obsolescent airframes to which these engines are harnessed.

It's easy to find the reason for the sorry state of airframe development. The engineering tools so necessary in this supersonic era have not yet been produced. There are no transonic tunnels and only a few subsonic and supersonic tunnels producing useful data.

It's not easy to explain the superior powerplants, particularly their altitude performance, because there are no high altitude engine test facilities yet available in Britain. Flying test beds, with their drawbacks of insufficient instrumentation and difficulty of repeating test conditions on successive flights, bear all the brunt of airborne proving.

Yet, in spite of these handicaps, the seven British engine manufacturers continue to design, develop and produce a large number of exceptional power plants. In no known case, is airframe development or research flying being held up by unavailable engines. Production airframes get their engines when needed; there are no "gliders" lined wingtip-to-wingtip outside British factory doors.

Five Engine Firms

In Britain today, five engine firms build the majority of the turbojets and turboprops now in production. Each firm also is pursuing an energetic development program aimed at future markets for military and civil aircraft, here or abroad.

• **Armstrong Siddeley Motors Ltd.** has developed its Sapphire turbojet to a thrust well above the initial type test rating of 10,200 lbs. on the A.S.S.A. 7. Later marks of the Sapphire are said to be almost complete redesigns of current series and feature more airflow capacity for greater thrust. The compressor of the Sapphire, although based on steam turbine practice because it was originally designed by Metropolitan Vickers' engineers, is excellent after prolonged difficulties with blade vibration.

Late models of the Viper, a long-life but simple and cheap turbojet, are approaching high thrust/weight ratios of about 3.6. Newest type tested Viper is the ASV. 8, rated at 1,750 lbs. thrust for a dry weight of less than 500 lb. The developed ASV. 10 gives 2,300 lbs. thrust without afterburner, and the ASV. 7 R. gives 2,400 lbs. with one.

Armstrong Siddeley shares with de Havilland the small-size rocket engine development in Britain. Engines so far announced have been the Snarler and the Screamer, but these have long since been supplanted by later designs.

• **Bristol Aero Engines** is making a determined drive to become the top engine firm in Britain. Its Olympus engine has been type tested in one modification at 11,000 lbs. thrust, newer marks of the Olympus—the BOl. 6 and the BOl. 11—are rated considerably higher, with 16,000 lbs. thrust as the reported rating for one. Now the engine for the production Vulcan, the Olympus is scheduled to go into the redesigned Javelin in a developed form with higher thrust.

One point worth noting: the Olympus was designed for high-altitude performance. The current world's altitude record of 65,876 ft. is held by the Olympus-powered Canberra. Bristol says the engine has been relit consistently above 50,000 ft.

There are industry reports of a new Bristol engine called the Zeus with a design thrust starting near the 20,000 lb. mark.

Two novel concepts at Bristol are the B.E. 25 supercharged turboprop and the lightweight Orpheus turbojet (AW Nov. 8, p. 29). The B.E. 25 has not yet run but many of its components have. Its compressor is aerodynamically identical and geometrically similar to that of the Orpheus, for example. Bristol has aimed the B.E. 25 at the civil turboprop transport market (AW Oct. 25, p. 13); it is in direct competition there with Rolls RB. 109 and Napier Elands future developments.

The Orpheus made its first flight in the Folland Gnat last July. Bristol has run up more than 2,600 hours time on the development engines thus far.

The combustion chambers, of radically new design, have an 800 hour life at this early stage of the program.

Bristol expects to qualify the Orpheus at its guaranteed rating of 4,850 lb. thrust by the end of this year. The engine installed in the Gnat now is running at less than 4,000 lbs. figure limited by current fuel pump capacity.

The Proteus 705 turboprop has been subject of minor redesign rising out of the writing off of one Britannia because of gear failure. New helical gears and a new English Electric actuator for propeller decoupling, characterize the revised engine. The 705 is now type tested at 3,700 eshp.

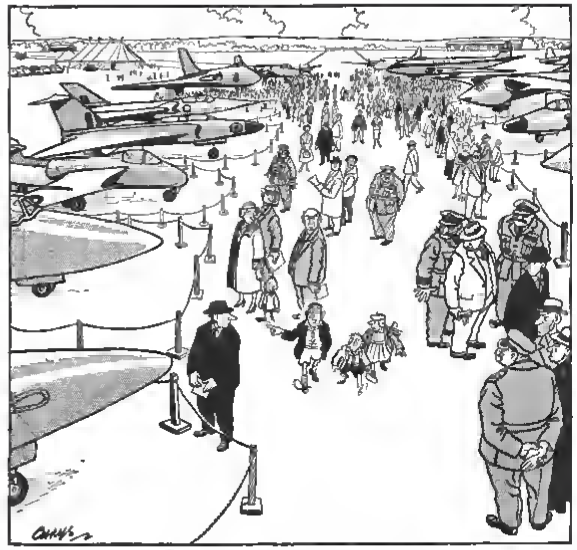
By the end of the year the more powerful Proteus 755 should complete its type test at the expected rating of 4,150 eshp. This engine is slated for all Britannia long range models.

Bristol's contribution to missile powerplants are ramjet engines. Some years back, the company showed an engine with a single cone annular inlet operating near Mach 2. Engine cycle analysis shows that ram pressures exceed possible compressor pressure rises at about Mach 2.5. It can be assumed that Bristol engineers know this and have developed their ramjets for Mach numbers approaching 3.

• **De Havilland's Gyron** was one of Farnborough's few big attractions. Although officially type tested at 15,000 lbs. thrust, this engine is in an early stage of development. Its prospects are good, although no British airframe is now scheduled to get the engine.

But de Havilland's pride is Gyron Junior DGJ. 1, a scaled down Gyron designed for thrusts in the 8,000 to 11,000 lb. bracket. One of these engines is now running on the test stand at the lower end of the design thrust range.

The current weight is about 1,500 lbs., a figure which should not increase to any great extent as the thrust values climb. Prospects are that the Junior will soon be announced as the highest-known thrust/weight ratio turbojet approaching a ratio better than 7 to 1. Observers see the engine as an Avon re-



'Obsolescent . . . Obsolescent . . . Obsolete . . Obsolescent . . .

. . . With the exception of the English Electric P. 1, shown landing, they have failed to produce a single advanced airframe.

SPECIFY SPERRY

Integrated Instrument System

New system provides simpler, more pictorial cockpit information

MORE FLIGHT DATA, in clearer visual form, in less space . . . this is a modern cockpit need now answered by Sperry instrument specialists. With the Sperry Integrated Instrument System, three new instruments are incorporated into the basic six now in common use, giving the pilot more of the data he needs—simply, conventionally, pictorially—without increasing the number of instruments on his panel.

The Sperry Integrated Instrument System consists of a more accurate and reliable primary direction instrument, a combined flight director and gyro-horizon, and a pictorial deviation indicator. Manual control of higher performance aircraft—through all phases of VFR and IFR flight plans—can be an orderly, efficient procedure with these panel aids.

NEW THREE IN BASIC SIX

Model C-6 Gyrosyn* Compass uses a master indicator with RMI (Radio Magnetic Indicator) presentation and data transmitters for providing accurate heading information to other equipment. A settable course marker also serves as the heading selector for the flight director. Model C-6A Gyrosyn Compass is also available with integral switch for selecting input to radio pointers.

Model HZ-1 Horizon Flight Director is a pictorial horizon with conventional sensing, effectively combined with the well-known Sperry Zero Reader* Flight Director. The non-tumbling horizon is graduated to ±90° in pitch from level flight and provides pitch and roll attitude information at all times while flying "zero" on the Flight Director. When not in use the Flight Director pointers can be retracted from view.

Model R-1 Pictorial Deviation Indicator displays aircraft position with respect to ground radio facilities. It includes a new pictorial presentation of the TO and FROM zones of VOR, and an omni-bearing selector. On ILS it provides both glide path and localizer deviation.

The System also includes a new lightweight, transistorized computer for more stable coupling to ILS during manual approaches. This Model Z-4 Flight Director Computer is completely free from the effects of cross-winds and varying pitch attitude resulting from changes in speed and loading.

The Integrated Instrument System is flexibly adaptable to all types of installations for present and future aircraft. The Sperry Model A-12-I Gyropilot* includes these new panel instruments and is operated from the same remotely mounted, non-tumbling gyros.

For complete information write our Aeronautical Equipment Division.

*T M Reg U S Pat Off.

INSTRUMENTS SHOWN ACTUAL SIZE

SPERRY GYROSCOPE COMPANY
Great Neck New York
DIVISION OF SPERRY RAND CORPORATION

CLEVELAND • NEW ORLEANS • BROOKLYN • LOS ANGELES • SAN FRANCISCO • SEATTLE
IN CANADA SPERRY GYROSCOPE COMPANY OF CANADA LIMITED, MONTREAL, QUEBEC

NEW NAPIER ROCKET ENGINE on test stand. Note clarity of shock diamonds in jet exhaust indicating the smoothness of operation.

placement. Its light weight and minute size—comparable to the Viper of 28 inch diameter and 66 inch length—fit it for a wide range of applications. Among these, is installation in one of the prototype interceptors now nearing flight at Saunders Roe and Avro.

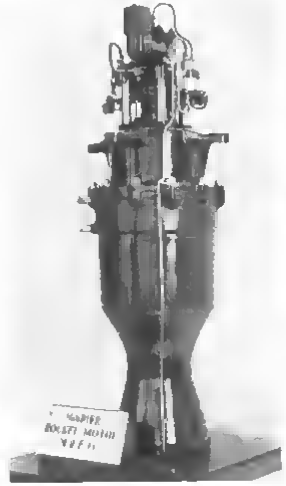
De Havilland also is heavily engaged in rocket engine development and during the last year received a type certificate for the Super Sprite, a cold rocket engine (AW Sept. 14, '53, p. 62). Cleared for fifty firings, the Super Sprite is a peroxide fuelled engine. A solid catalyst breaks down the peroxide into superheated steam and oxygen providing the major mass flow for thrust. There is enough oxygen in the exhaust to enable kerosene from the plane's main tanks to be burned in a process parallel to that of the jet engines after burner. Maximum thrust of the Super Sprite is 4,200 lbs. for 40 seconds.

• D. Napier and Son, Ltd. is generally regarded as the dark horse in the gas turbine race. Rated as having one of the top technical staffs in the engine business, Napier established itself as a major threat to its biggest competitors by producing the Eland. Developed versions of the current powerplant are expected to give better than 4,000 eshp., to rank that engine in a class with the Bristol B.E. 25 and the Rolls Royce RB 109.

Napier gas turbines for helicopters are unique in Britain.

A special model of the Eland is slated for Fairey's Rotodyne and will develop 3,150 eshp. Two of the company's Oryx gas generator units are the heart of the Hunting Percival P. 74 helicopter due for flight testing soon. Eventual development of the Oryx will rate the engine at 900 gas horsepower compared with current value of 750.

Napier is one of five main sources



NAPIER Rocket Engine at Farnborough.

for Rolls Royce Avon engines having produced the units under subcontract arrangements for several years. The firms experience in production of quality engines plus the high caliber of its engineering and development staff, make it a strong contender for future business.

• Rolls Royce Ltd. made its big bid with the bypass Conway this year. It was not an impressive performance because of the limitations of the Avro Ashton high-altitude testbed that mounted the single Conway in a pod below the fuselage.

Later in the week, there were reports that the Royal Air Force would ask the

Ministry of Supply to cancel orders for six Vickers 1,000 jet liners which the RAF had bought directly off the drawing board.

The RAF was reported to be unhappy with the range, weight and flexibility of the aircraft. Because the V 1,000 is the only airframe to which the Conway is currently allotted, the engine's future does not look good at the moment. There are some observers in the industry who believe that Rolls has shelved development of the engine until such time as the airframe picture is more complete.

But regardless, the bypass offers advantages of fuel economy and noise reduction not now available in more conventional designs.

Other Rolls' developments include clustered powerplants of the Soar type for VTOL applications with at least one test vehicle so designed and near the flight stage.

The cross licensing agreement between North American Aviation and Rolls-Royce established the British firm as the future source of large rocket engines in its home country. But here again, Rolls-Royce may find itself with an engine and no airframe to take it.

Other engine manufacturers include Blackburn, manufacturing the Turbomeca line of small turbojets under license, and Alvis, making the Leonides and the Leonides Major for helicopters, tenders and utility transports.

Great Difference

This survey emphasizes the enormous disparity between engine and airframe development. There are some signs that British industry has finally recognized this great gap and is moving to do something about it.

Although the Hoover Commission report was publicly criticized here, it was privately accepted by most members of industry as correct in sum if not in each specific instance.

Plainly, Britain's aeronautical effort is spread much too thinly. Even with the booming economy of the country, in better shape than ever before, there is simply not enough money to finance the design and building of a British

"Actually we're not far behind the Americans in the vertical take-off field"
Reproduced from PUNCH, September 7, 1955

NAVY'S NEWEST JET

NEWEST SUPERSONIC FIGHTER, the Navy's Chance Vought XF8U-1, is a slender, sweptwing aircraft designed for air superiority missions in areas of sea operations. Throughout, the XF8U-1 is characterized by its uncluttered design and simple structure. It was built to take full advantage of the tremendous thrust of its Pratt & Whitney Aircraft J-57 turbojet engine.

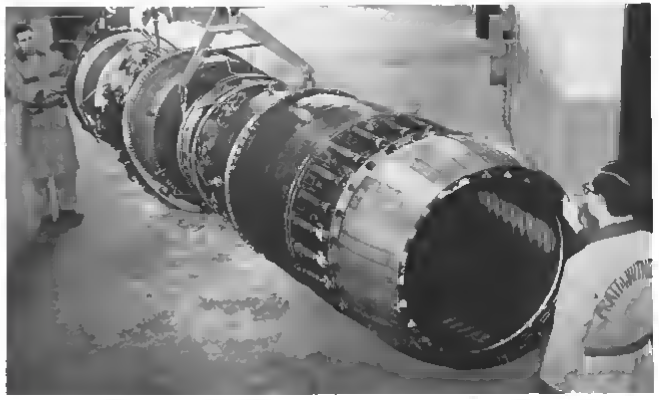
ONE OF THE DIVISIONS OF
UNITED AIRCRAFT CORPORATION

POWERED BY THE J-57

A new supersonic jet fighter, the sleek Chance Vought XF8U-1, is now being test flown for the Navy. Like four other Navy and Air Force fighters, all faster than sound, it is powered by Pratt & Whitney Aircraft's big J-57 turbojet engine.

In the XF8U-1, an efficient J-57 power plant is combined with a trim, lightweight airframe to produce an advanced aircraft capable of supersonic speed, high rate of climb and exceptional ceiling. Demonstrated fuel economy of the J-57 promises, as well, the long endurance required in carrier operations.

The new Chance Vought aircraft is designed as a carrier-based day fighter, to control the air in areas of sea operations. Again, in this important addition to the Navy's air strength, the Pratt & Whitney Aircraft J-57 turbojet engine continues to make its vital contribution to American Air Power.



AN EFFICIENT J-57 with afterburner, like that above, develops well over 10,000 pounds of thrust for Chance Vought Aircraft's new XF8U-1. In a trim, lightweight aircraft, this proved, high-thrust engine provides power to meet specifications for high rate of climb, exceptional combat ceiling, and supersonic speed.

Pratt & Whitney Aircraft

MAIN OFFICE AND PLANT: EAST HARTFORD, CONNECTICUT • BRANCH PLANTS: NORTH HAVEN, SOUTHINGTON, MERIDEN
In Canada: Canadian Pratt & Whitney Aircraft Co., Ltd.

Strategic Air Command (needed as a nuclear bomb delivery system), the development program for defensive missiles, an energetic powerplant effort and sponsorship of duplicating effort in fighters and interceptors.

Add to this the fundamental fact that the Royal Air Force still worries about getting enough pilots to fly the planes it has, let alone those required for an expanded force. Legislation is expected to be introduced in Parliament calling for doubling the average jet pilot's salary to the $2,800.00 level in hopes that this will attract the better types of young men that are required for the job.

Pride and Consequence

But pride, perhaps as much as anything else, keeps the British industry trying to do everything at once.

The situation roughly parallels that of the French industry a few years after World War II.

French designers, frustrated by long years of doing nothing, rapidly designed and built more prototype engines and airframes than any other country has before or since. But in France, unlike in Britain, someone called a halt to the haphazard production of airplanes with no end mission in mind but to satisfy the engineers. The French industry now proceeds along the lines of a set plan, concentrating on types best suited to the particular problem of France and her position in NATO.

The Salon de L'Aeronautique in Paris and Le Bourget this year was an eye opener to the visiting British engineers.

They saw themselves losing technical ground to the French.

The awards of NATO lightfighter contracts to Breguet, Dassault and the fast moving Italian Fiat Co. were other bodyblows to British engineering prestige.

This has been a bad year for British aviation. Starting with the Comet inquiry, a series of technical setbacks has rocked the British aviation industry time after time.

The important criticism of the British aircraft industry is not that it is now producing obsolescent aircraft but that, unless something is done quickly, it may never again produce any other kind.

Piasecki Addition

Piasecki Helicopter Corp. leased 9,000 sq. ft. of space near its Morton, Pa., plant to provide additional facilities for engineering personnel. The company is moving about 120 engineers into the new plant, where they will work on programs for military and commercial production helicopters.

USAF Contracts

Following is a list of unclassified contracts for $25,000 and over as released by Air Force Contracting Offices

LACKLAND AIR FORCE BASE, SAN ANTONIO, TEXAS

University of California, Berkeley 4, Calif., development of a Germanium Crystal Neutron Dosimeter. (Contract AF 41(657)-143), job, $33,407.

LAREDO AIR FORCE BASE, FLA.

Reeves Instrument Corp., 215 E. 91st St., New York 28, N. Y., design, development, fabrication and installation of high power RF attenuator for AFMTC tracking radar, Model II. (PR No. FP 1(56)-144) supplemental agreement No. 12 to AF 08(600)-299, job, $30,858.

Raymond Rosen Engineering Products, Inc., 32nd and Walnut Sts., Philadelphia, 4, Pa., amplifier, 1760 NL 038031, 1*11, 24 ea.; telemetering receiver, 1700 NL-728458, 787, 24 ea. (PR's FP 1(56)-212 and FP-1(56)-213), $48,611.

Pacific Division, Bendix Aviation Corp., 11600 Sherman Way, N. Hollywood, Calif., study, development and fabrication of underwater beacon and underwater detection unit, (PR No. FP 1(51)-100), job, $128,400.

Pan American World Airways, Inc., Guided Missile Range Division, OMU 308, Patrick Air Force Base, Fla., necessary services and materials for the management, operation and maintenance of the missile test range facilities and related activities of the Air Force Missile Test Center, for an additional period ending 30 Jun 56, supplemental agreement No. 7 to Contract AF 18(600)-481, (PR No. MTR-56-1), job, $17,221,209.

SEWART AIR FORCE BASE, TENN.

Empire Gas Engineering Co., 7 Baltimore Place, N. W., Atlanta, Ga., conversion of heating facilities to natural gas, (IFB 40-602-55-51), (Contract No. AF 40(602)-359), job, $251,883.

Banks, Elliott & Ramsey, Inc., 3321 10th Ave., North, Birmingham, Ala., conversion of heating facilities to natural gas, (IFB 40-602-55-51), (Contract No. AF 40(602)-360), job, $47,712.

WILKINS AIR FORCE STATION, SHELBY, OHIO

Goody Tire Co., 141 14th St., N. W., Atlanta, Ga., services to recoat and/or recapole aircraft casings, Class 04C, (PR WL-5449382), call contract.

LOWRY AIR FORCE BASE, COLO.

Mucklow Baking Co., 2000 Wallce St., Denver, Colo., bread, white, whole wheat, rye and raisin, (IFB 85-600-56-1), various quantities, Est. $39,984.

International Business Machines Corp., 590 Madison Ave., New York 22, N. Y., factory training, field and organization training, MA-2 bomb navigational system, (negotiated), training for eighty (80) Air Force personnel, $80,785.

Navy Contracts

Following is a list of unclassified contracts of $25,000 and over as released by Navy Contracting Offices

AVIATION SUPPLY OFFICE, PHILADELPHIA

Mallory-Sharon Titanium Corp., Niles, Ohio, titanium alloy, (IFB 383-1030-55), various, $98,173.

The Leland Electric Co., Div. American Machine & Foundry Co., 1601 Webster St., Dayton 1, Ohio, inverters, (IFB 383-1075-55), 132 ea., $47,520.

Benjamin Franklin Paint and Varnish Co., 4870 Langdon St., Philadelphia 24, Pa., enamel, semi-gloss, (IFB 383-1078-55), 44,000 gals., $113,767.

Allen Paint & Varnish Co., 32-00 Bufflington Ave., Livingston 31, N. J., paint, deck,

SNAP-ACTION SWITCHES ... for real space economy

Small size, light weight, and added dependability go hand-in-hand in all Hetherington switches. For the lightning-fast Hetherington snap-action mechanism permits higher ratings in less space without deceptive "clicks" or "snaps" ... and with no danger of teasing the switch ON or OFF contact.

Shown below are just a few of the many Hetherington snap-action switch designs in the 5 to 50 ampere range


Approx. Actual Size

MINIATURE TOGGLE SWITCH *type T2104*

Only 1[9/16]" long by [1/32]" in diameter, this new Hetherington design takes considerably less space than comparable rectangular switches. The T2104 uses a positive cam roller snap-action that "feels" and performs like a toggle switch should. Internal arrangement "makes" contact between separate pairs of terminals in each position—can be connected for SPDT action. Conservatively rated for 50,000 cycles at resistive loads of 10 amps, 28 volts dc; 5 amps, 115 volts ac.


Approx. 1.5 Actual Size

HOLDING COIL SWITCH

... the answer to many control problems

This "control engineer's delight" combines relay, switch, and pilot light functions in a single unit only 1[5/16]" in diameter by 3⅞" long. A built-in solenoid holds the switch on contact until solenoid circuit is externally interrupted. SPST switch circuit may also be broken manually by pulling the switch knob. Knobs may have built-in lights to indicate when the holding circuit is energized.


Approx. Actual Size

"JR" SERIES Push-Button—Momentary Contact

Over 600 Types

These unusually rugged and dependable snap-action switches have become almost a "standard" for critical aviation and industrial applications. Six circuit arrangements and over 20 mounting adapters match virtually any requirement. Rated for inductive loads of 17 amps, 24v dc; 15 amps, 115v ac, or 7.5 amps, 230v ac. U.L. Approved for ac. Similar switches for MIL-6743 (MS-25089) applications available as Type W100.

HETHERINGTON

SHARON HILL, PA.

AVIATION & INDUSTRIAL TYPE SNAP ACTION SWITCHES
INDICATOR LIGHTS
SWITCH-LIGHT COMBINATIONS
SWITCHGEAR ASSEMBLIES • RELAYS • COILS

West Coast Division: El Segundo, California

(IPB-287-1017-55) 2,460 gals, $43,349

Curtiss-Wright Corp., Caldwell-Wright Div., Caldwell, N. J., services & material for rollers (383/23958 22P1/5/56/Arrol) 7,000 ea. $93,310

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., brushes (383/2000-402/55) various $231,386

McDonnell Aircraft Corp., P. O. Box 516, St. Louis, Mo., tank assys., (383/8504-403/55) 90 ea. $138,144

Perco Products Div., Borg-Warner Corp., 24700 N. Miles Rd., Bedford, Ohio, maintenance parts, (383/2117-171/50) various $34,030

Scintilla Div., Bendix Aviation Corp., Sherman Air, Sidney, N. Y., maintenance parts used on engines, (MIPR 41-608-5-03H 1120, MIPR 31-608-5-03H 11201) various, $25,803

Chandler-Evans Division of Niles-Bement-Pond Co., West Hartford, Conn., overhaul of fuel regulator (383/22055 11P5/1/56, 383/23925 19P8/5/56, 383/2111 12/51) 124 ea. $56,509

Bendix Products Div., Bendix Aviation Corp., 401 Bendix Drive, South Bend 20, Ind., maintenance parts to overhaul Bendix controls (383/2117-178/50), various $14?,?11

Hewlett-Packard Co., 275 Page Mill Road, Palo Alto, Calif., electronic test equipment (PRENII-12/55) various $61,154

Wm. R. Whittaker Co. Ltd., 915 N. Citrus Ave., Los Angeles, Calif., handbooks, (PRENII 4035 55) various, $32,011

Minneapolis-Honeywell Regulator Co., 2600 Ridgway Rd., Minneapolis 13, Minn., tank units (383/2120-408/52, 383/2120-140/53) various $49,903

Wm. R. Whittaker Co. Ltd., 915 N. Citrus Ave., Los Angeles, Calif., valves 383/2150-1018/52, 383/2150-419/53, 383/2100-120/54) 137 ea. $61,081

Union Electric & Mfg. Co., 1957 Summit Ave., Jersey City, N. J., test sets (383/2286-101/50) 703 ea. $170,180

Jaegle Paint & Varnish Co., 20th & Parker Sts., Philadelphia 46, Pa., enamel semi gloss (185/15-2034/50) 4000 gals $94,170

John Oster Mfg. Co., 1 Main St., Racine, Wis., motors (383/2130-401/52), 1042 ea., $100,223

Lenoir Wood Finishing Co. Inc., 204 E. Harper Ave., Lenoir, N. C., enamel (155/152975/5a5) 41000 gals $181,580

Grimes Mfg. Co., 515 N. Russell St., Urbana, Ohio, spare parts (PRENII 2710 55 Aero) various $77,834

Weston Hydraulics Ltd., 10918 Burbank Blvd., North Hollywood, Calif., assemblies (383/2150-1070/52, 383/2150-400/53) various $48,0?1

Turco Products Inc., 55 Fairmount Ave., Philadelphia 23, Pa., compound, (383/29001-532 C4/4/56) 42345 gals $89,911

Model Engineering & Mfg. Co., Inc., 50 Frederick St., Huntington, Ind., signal generator (MIPR 33-604-5-17C-1964, MIPR 33-604-5-17C-1910, MIPR R55-2191-SC-SMD-24) 119 ea. $95,210

AiResearch Mfg. Co., The Garrett Corp., 9851-9951 Sepulveda Blvd., Los Angeles 45, Calif., tools and test equipment (383/2160-403/55), various $455,801

Grimes Mfg. Co., 515 N. Russell St., Urbana, Ohio, lights and parts (383/23081-38-E5/1/56), various, $23,451

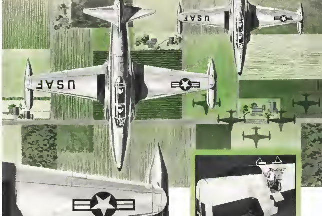
The Goodyear Tire & Rubber Co. Inc., 1144 E. Market St., Akron 16, Ohio, wheel and brake assys (383/2110-1245/52, 383/2110-646/53, 383/2110-57/54) various, $256,144

Benjamin Franklin Paint & Varnish Co., 4820 Langdon St., Philadelphia 24, Pa., enamel (MIPR(23 195)R50-5344-ENG), 5000 gals $114,450

Utica Div., Bendix Aviation Corp., Utica, N. Y., maintenance parts to support starter assys (383/2117-150/50), various $153,131

Parker Aircraft Co., 5827 W. Century Blvd., Los Angeles, Calif., valves and manifold assys. (383/2150-100/54, 380/2150-280/53, 383/2150-381/57) various $30,570

Precision Associates, Inc., 654 Cumberland St., Brooklyn 38, N. Y., frequency meters, (MIPR 33-604-5-11C-1712, MIPR 33-504-5-11C-1857, MIPR 33-604-5-17C-7884) 427 ea. $101,821



Link's C-11B was modeled on the Lockheed F-80 jet aircraft, and serves as a basic ground trainer for student pilots learning jet flight. This trainer was developed under Link basic patents.

WHEREVER YOU FIND AIRPOWER, YOU'LL FIND LINK!

Graduating from pistons to jets demands special skills and training of our pilots.

And, to help the men of our air arm bridge the gap between the two, Link designed and built the C-11B Jet Instrument Trainer. Over 500 of these trainers are at work right now—at more than 100 U.S. and foreign air bases throughout the free world.

THE C-11B, through its reproduction of the many conditions of jet flight, is giving our fighter pilots realistic training in all phases of single-jet flying—from the pre-takeoff inspection right through to an instrument landing.

THE C-11B is also used by veteran jet pilots to help them maintain peak proficiency in the performance of their vital assignments.

This is one of the many ways in which Link helps pilots keep pace with the rapid development of jet aircraft in America.

LINK INVITES APPLICATIONS FROM QUALIFIED ENGINEERS AND DRAFTSMEN

LINK AVIATION, INC.

BINGHAMTON, N. Y.

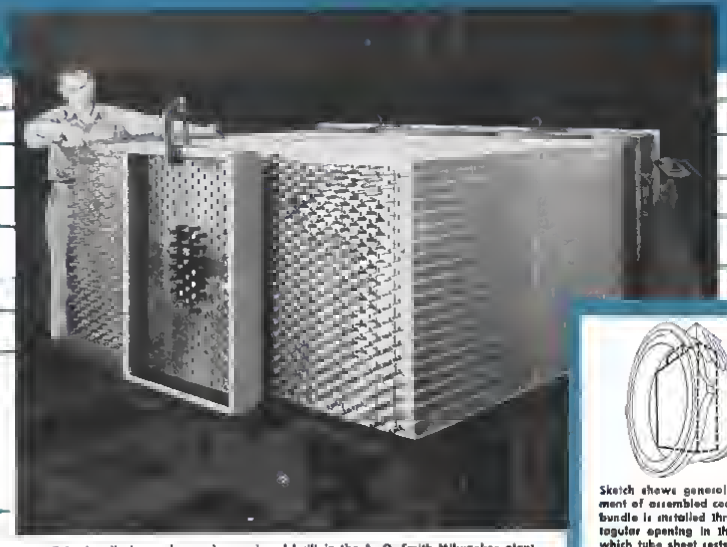
A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION

Manufacturers of world-famous Link trainers and simulators (such as F3D, B-47, F-89, F2H 2, F2H 3) • simulated aircraft instruments • specialized computers • servo mechanisms • computer components • gear boxes • friction over-drive clutches • precision potentiometers • rate voltmeters • phase angle meters • and other electronic devices

A. O. Smith engineers and designs . . .

85,000,000 BTU per hr. cooler for GAS DYNAMICS FACILITY

Cooler shell of welded construction is 15 feet in diameter.



Tube bundle for cooler as designed and built in the A. O. Smith Milwaukee plant.

Sketch shows general arrangement of assembled cooler. Tube bundle is installed through rectangular opening in the top on which tube sheet rests.

Made for each other . . .

sonic wind tunnel cooler shell and tube

bundle built as a unit by A. O. Smith

● A. O. Smith's shops in Milwaukee produced this supersonic wind tunnel cooler and similar coolers for the Gas Dynamics facility of the Arnold Engineering Development Center at Tullahoma, Tenn. The cooler's thermal capacity is approximately 85,000,000 BTU per hr. It's designed for 140 psi on the water side, full vacuum on the air side, and handles as much as 1,890,000 lbs. of air per hr. with inlet temperatures as high as 410° to 435° F.

A. O. Smith offers the outstanding advantage of being able to build a cooler shell of such large capacity and at the same time provide the equally exacting tube bundle which it houses. Thus, single responsibility for shell design and fabrication gives economies in design, manufacture and installation.

SHELL — The 15-ft. diameter shell, above, is so big and tolerances are so exacting that construction required a manufacturer with combined shop for both big vessels and heat exchangers. Maximum out-of-round tolerance of weldment is but one-quarter of wall thickness. The ends of the vessel are perpendicular to axis within –0' 10". Clearance between baffles and the tube bundle, when installed, is held to 0.125-in. to prevent air by-pass.

TUBE BUNDLE—Provides approximately 80,000 sq. ft. of outside surface, made up of three-quarter in. tubes and aluminum fins — spaced 12 to the inch — mechanically bonded to the tubes. Multiple floating heads of A. O. Smith design assure freedom from thermal stress . . . meet extreme operating conditions . . . permit ready accessibility for repair and maintenance.

Whatever your heat transfer problem, be sure to contact A. O. Smith. Mail coupon below for literature describing other A. O. Smith wind tunnel installations.

Through research A.O. Smith *. . . a better way*

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A. O. Smith Corporation
Process Equipment Division Dept. 2010 Milwaukee 1, Wisconsin

Please send me literature describing A. O. Smith wind tunnel cooler installations in the Heat Transfer field.

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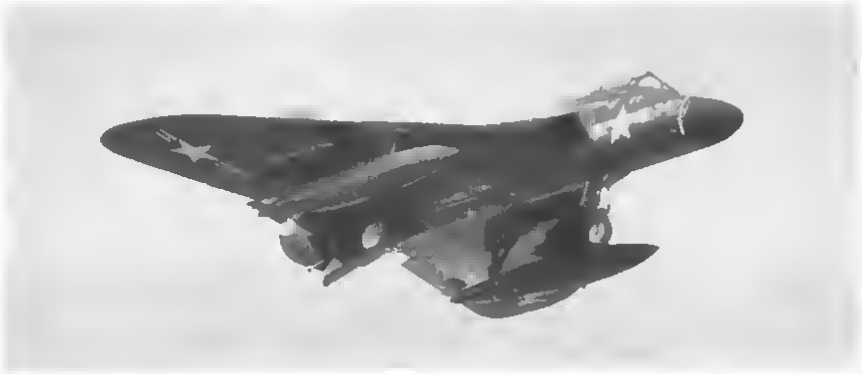

F4D, A4D Team Up for Carrier Trials

DOUGLAS YF4D-1 SKYRAY supersonic fighter (above), its wings loaded with external stores containers, wheels low over the water for landing aboard U. S. S. Ticonderoga in carrier trial. At left, the fighter awaits launching by one of the carrier's steam catapults. Pilot has inboard trailing edges of wings (pitch trimmers) elevated. Note pointed projection above tailpipe which keeps exhaust blast of the 10,000-lb. thrust class F&WA J57 turbojet from interfering with airflow past the Skyray's tail.

DOUGLAS A4D-1 SKYHAWK (below) comes in for landing aboard Ticonderoga. Navy pilots say the tiny Skyhawk shows extremely good handling characteristics at low speeds. Like its F4D team mate, the Skyhawk has a tailpipe extension to reduce interference with airflow past the tail surfaces.

PRODUCTION BRIEFING

▶ **Armco Steel Corp** has organized a new sales service department with James G. Wikoff as manager, in order to streamline the various service functions of the company's present sales division.

▶ **Fiberglas package cushioning**, meeting military specifications is manufactured in a wide range of densities to 30 lb./cu. ft. Manufactured by Owens-Corning Fiberglas Corp., Toledo, Ohio, the material is designed for the protection of delicate instruments and machinery and other fragile items.

▶ **High pressure, precision die castings** in simple or complex shapes for aircraft, commercial and electronic use, are available from Harvill Corp., Los Angeles, Calif. Die castings of aluminum, zinc, magnesium and copper base alloys are available in a full range of sizes and shapes.

▶ **British Oxygen Co. Ltd.**, London, England, and The Aro Equipment Corp., Bryan, Ohio, announced the formation of a new company, British Oxygen-Aro Equipment Ltd. The new company will operate separately from its parent companies with headquarters in London.

▶ **Associated Manufacturers of Premolded Joint Materials** has been organized with executive offices at 120 S. La Salle St., Chicago. Officers are: President, J. W. Lagerquist, Celotex Corp.; Vice President, Wallace Fischer, Servicised Products Corp.

▶ **Langevin Manufacturing Corp.**, a subsidiary of the W. L. Maxson Corp., have moved their offices to 47-37 Austell Place, Long Island City 1, N. Y.

▶ **Western Carbide Corp.** has been formed as a subsidiary of Superweld Corp., No. Hollywood, Calif., to manufacture and market proprietary products. The new company manufactures hardfacing pastes, hardfacing flux, bulk carbides and bordes.

▶ **Consolidated Engineering Corp.'s** Systems Division has moved to larger quarters in Pasadena, Calif. Formed only 18 months ago, the System's Division has expanded its engineering staff five-fold.

▶ **National Vulcanized Fibre Co.**, Wilmington, Del., has formed an operating board responsible for all management policies of the company with Eugene R. Perry, President, as chairman.

LETTERS

Claim Disputed

May we refer to the letter originated by Mr. Clarkson, United States Representatives of Vickers Armstrong Ltd., published in your issue of 13 June, 1955, page 79.

Our remarks in that regard may be summed up in the brief statement that Mr. Clarkson's views do not convey a true indication of DC-6B operation in Australia as carried out by Australian National Airways Pty. Ltd.

Mr. Clarkson has stated that a Trans Australian Airlines Vickers Viscount held the Perth/Adelaide record with a flying time of 3 hours 57 minutes.

Whilst that was correct at the date of Mr. Clarkson's letter the record has since been slashed by an ANA DC-6 series aircraft which covered the 1,415 miles in 3 hours 6 minutes—setting a record for a commercial aeroplane in Australia with an average speed of 444 miles per hour.

In addition, the Viscount figures quoted in the letter are eclipsed by ANA's record with DC-6s and DC-6Bs. For instance: with a full load of 58 passengers and personal baggage ANA's DC-6Bs carry an average of 7,000 lbs. air cargo. They have carried over 9,000 lbs. per individual flight. This compares more than favourably with the Viscount which on the Adelaide/Perth route seats 36 passengers and a small amount of cargo (usually about 500 lbs.).

Mr. Clarkson further stated that, at the time of writing, no Vickers Viscount had had to refuel in transit on the Easthound Perth/Adelaide run. That was no doubt correct but in the opposite direction, Westhound against severe seasonal head winds, the Viscounts have been frequently forced to refuel at either Kalgoorlie, Forrest or Ceduna—in one instance, at least, at all three places.

A further feature of the DC-6B as compared with the Viscount on the Adelaide/Perth route is the fact that with a payload substantially double that of the Viscount the DC-6B could lift sufficient fuel for a non-stop return trip Adelaide/Perth/Adelaide should circumstances necessitate.

For your information, ANA now possess two DC-6s and two DC-6Bs and has an additional order with the Douglas Aircraft Inc. for two more DC-6Bs for delivery late 1956. This undoubtedly reflects the confidence of this organization in both this aircraft and its manufacturers and continues the tradition established by ANA in 1936 when it became the first commercial operator of Douglas equipment in Australia. In that regard, it is of interest to record that ANA is one of the few world airlines that has operated the range of Douglas Commercial Products from the DC-2 to the DC-6B—including the rare DC-5.

Ian G. Webster
Traffic and Sales Manager
Australian National Airways Pty. Ltd.
289 William St.
Melbourne, C.1
Australia

Capital Praise

Mr. W. L. Remmert's letter in the September 5th issue of AVIATION WEEK raises an interesting question: how soon will Capital's Carmichael be credited with "Pioneering" business and executive flying? It shouldn't be long, he is already revered for the development of low-cost air coach.

The fact that the industry knows better will probably be ignored by CAB, they haven't much time for those of us who did develop air-coach. They're rather busy keeping us guessing as to their interpretation of their reason for existence. As someone has said: "The CAB is the greatest obstacle to the growth of mass air transportation since gravity."

Many of the best people in the irregular air carrier field are turning to executive and business operations simply because its rapid growth, pushed by such organizations as Remmert-Werner offers some measure of stability and security which will be unknown to the non-schedule airlines until CAB (if and when) in its august bumbling, hackhanded way makes up its bureaucratic mind to get with it or get off it. And now, as the scheduled airlines move into private flying, too, the CAB can keep the guessing game going as infinitum ad nauseam.

Come the next campaign, these Washington orators will bellow of "creeping socialism," "free enterprise," "private initiative" and other things which have made this nation great. Mr. Remmert should be careful that in employing several thousand people advancing the industry and backing up national defense he does not infringe on the privileged sanctuary of those hogs at the public trough, those tax supported monopolists, the scheduled airlines of America.

Lesley N. Forden
18164 Pearl Street
Alameda, California

Cabinet Rollers?

A correction to Industry Observer, page 9, Aug. 22. Messerschmitt is building Kabinenrollers, not cabinet rollers (as Aviation Week reported).

J. Zeppler
Syracuse, N. Y.

(Aviation Week stands corrected. Our translation was close but not close enough. Messerschmitt's Kabinenrollers are three wheel motor scooters with closed cab.)

707 Slow Rolls

On August 7, 1955, the Gold Cup" races were held in Seattle. There were, by estimate, 500,000 spectators on the race course to see this event.

About one hour before the races started the Boeing 707 made a few low passes at the race course. One pass was made from South to North at about 2,000 feet altitude with a slow roll being executed in full view

Mountain of mail greets first call for product information for the AVIATION WEEK

Buyers' Guide

Editorial questionnaire brings quick, enthusiastic response from more than 2,700 companies... flood of mail continues.

More than 2,700 aviation manufacturers, suppliers, distributors and service companies, eager to be listed in the AVIATION WEEK BUYERS' GUIDE, built that mountain of mail you see surrounding our Miss DiLorenzo. AVIATION WEEK mailed questionnaires throughout the aviation industry to gather information for Buyers' Guide editorial listings. The response — as you can see — was immediate, enthusiastic, and overwhelming! Many hundreds of companies further documented their enthusiasm for the Buyers' Guide with letters asking for information on specific subjects to be covered . . . editorial departments . . . advertising rates and specifications . . . reservations for extra copies.

Many companies sent complete product catalogs to provide detailed information for editorial listings. More responses pour in every day.

The Aviation Industry's eagerness and enthusiasm for the AVIATION WEEK BUYERS' GUIDE is a sure and certain indication of solid, top-flight advertising value. There is still ample time (forms close in November) for you to take advantage of this matchless advertising opportunity. Call your AVIATION WEEK representative today for full information... and be sure to ask him about the Buyers' Guide's special discount rates for catalog-type advertisements.

AVIATION WEEK

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of everyone present plus two local television stations giving coverage to the race.

My question is, 'Why is an experimental airplane permitted to do acrobatics over a congested area and then kept quiet?'

I have nothing against Boeing or any of its officials or employees but I cannot see where a roll of a transport type aircraft over a crowd of one half million people helps to prove anything about its airworthiness.

Edward A Evans
5701 239 Place S W
Mountlake Terrace Washington

Correction on Orenda

I am sorry to have to point out that your issue on September 12 p 7 International carries a basic error concerning the status of this company (Orenda Engines Limited) in that you refer to us as an affiliate of Canadair Limited.

This of course is not so Canadair Limited is an important customer of this company but there is no corporate link between us Canadair being a member of the General Dynamics group and ourselves a member of the A V Roe Canada organization.

Cyril Bassett Manager
Public Relations Dept
Orenda Engines Ltd
Box 4015
Terminal A
Toronto Canada

Russian Air Power

In Aviation Week I have noticed your editorials concerning government release of Russian air power.

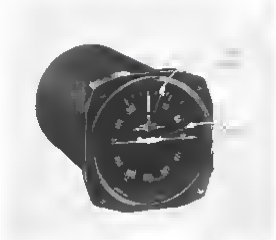
I am in complete agreement with you on this subject. During my hitch in the U S A. I was a crew chief on a H19D Sikorsky type helicopter in this position I was able to observe some of our own air power I flew into many restricted airports and saw first hand many of our best aircraft.

I believe the American people should be informed as to our own air power as well as that of Russia. They see (the news reports) that we are superior in almost every way pertaining to air strength. I am sure this is false for Russia has many fine air planes and will continue to build more. This is my opinion of course and I can not prove the above statements.

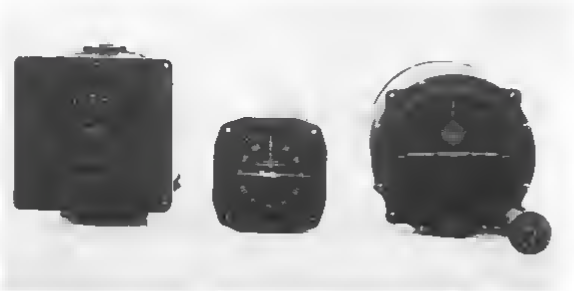
You are in a position to harass the big boys in Washington please continue to do so for the ultimate sake of the American people.

Allan W Harriman
7224 Hazel Avenue
Upper Darby, Pennsylvania

Aviation Week welcomes the opinion of its readers on the issues raised in the magazine's editorial columns. Address letters to the Editor, Aviation Week, 330 W. 42 St., New York 36, N. Y. Try to keep letters under 500 words and give a genuine identification. We will not print anonymous letters, but names of writers will be withheld on request.



NAFLI three-in-one indicator displays airplane heading, pitch and bank angles. Miniature airplanes attached to vertical and horizontal needles show bank and pitch angles



COMPARISON OF THE NAFLI indicator (center) with the separate heading-attitude instruments it is designed to replace

Lear's New Navigation System Simplifies Flying, Reduces Fatigue

By Philip J. Klass

Santa Monica, Calif.—Lear's claim that its new Natural Flight Instrument (Nafli) greatly simplifies blind flying and reduces cockpit fatigue is easy to accept after only a few moments at the controls of a plane equipped with the device.

The new instrument displays aircraft heading, pitch and bank angle on a single 3-inch cockpit instrument, in a radically different fashion.

Nafli, now in its pre-production evaluation stage, is novel in several important respects:

• **Independent pitch and bank indicators.** Aircraft pitch angle is shown by a horizontal pointer, with the side profile of a miniature plane attached, which rotates about the center of the instrument. Bank angle is displayed on a vertical pointer to which is attached a rear view of a miniature plane. Heading is shown on a conventional rotating dial. (See photo, above.)

• **Outside-in presentation.** Unlike conventional attitude indicators where the pointer or sphere moves as if the pilot were in the airplane looking out, Nafli enables the pilot to "step outside" and look at his plane's attitude. The pilot maneuvers his plane to keep the miniature airplane profiles at the desired attitude.

• **Bank angle and heading are superimposed.** Since airplane bank angle determines rate of change in heading, Lear believes it should be displayed with heading information, rather than with pitch angle as in conventional horizon gyros.

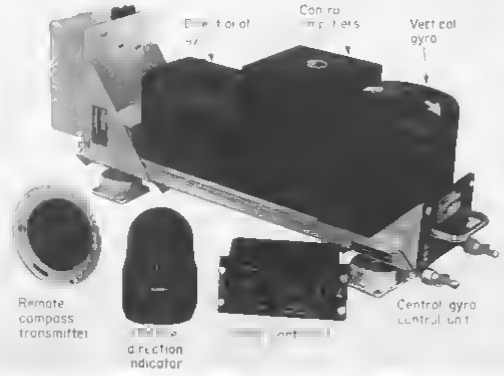
It appears entirely possible that Lear may eventually expand its basic Nafli, by adding servo amplifiers and servo actuators, to make it into a combination automatic pilot and flight instrument system.

What Comes Naturally

Flying Nafli, according to Lear, consists merely of "doing what comes naturally." When the pilot wants to level out and observes the miniature plane profile in a climb, there is no hesitation or question of which way to move the control stick. The same is true when the rear profile on the bank needle shows the plane in a bank.

Conventional attitude indicators, employing the "inside-out" philosophy, attempt to simulate the view which the pilot would see out the cockpit window if he were flying contact. However, there is evidence that much of the intended effectiveness is lost, probably because the horizon presentation is too artificial and/or too small.

Given sufficient instrument flight training, pilots can be taught to "chase" the horizon bar (move the stick in the same direction as the bar moves), but this lengthens the training period, according



SYSTEM consists of indicator, remotely located gyro control unit, panel controller and remote compass element, if gyro slaving is desired. Weight is about 25 lb

Clifton Precision 14 lb. Automatic Navigational Systems

Developed for the Navy — *Bureau of Aeronoutics*

LONG RANGE SPHERICAL NAVIGATOR

Presents at all times remaining distance to destination, in miles, along the great circle route.

Presents the heading at all times which must be flown to make good a great circle course to the objective.

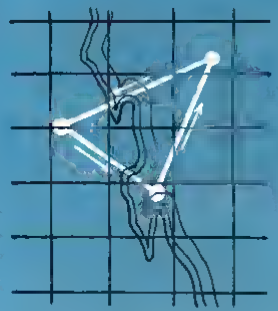
Continuously indicates ground position during flight.

Indication is continuously corrected for even radical departures from programmed course without impairment of accuracy.

When desired, indication can be instantly switched to "base" giving bearing and distance to point of departure instead of destination.

Accuracy (up to 1000 miles) 1½% of distance travelled or 5 miles. Ranges available to 1000 and 3000 nautical miles.

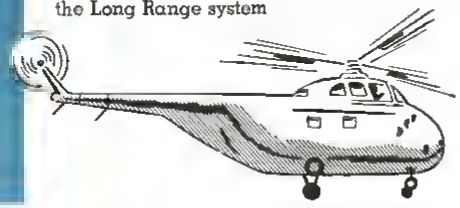
SHORT RANGE PLANE NAVIGATOR

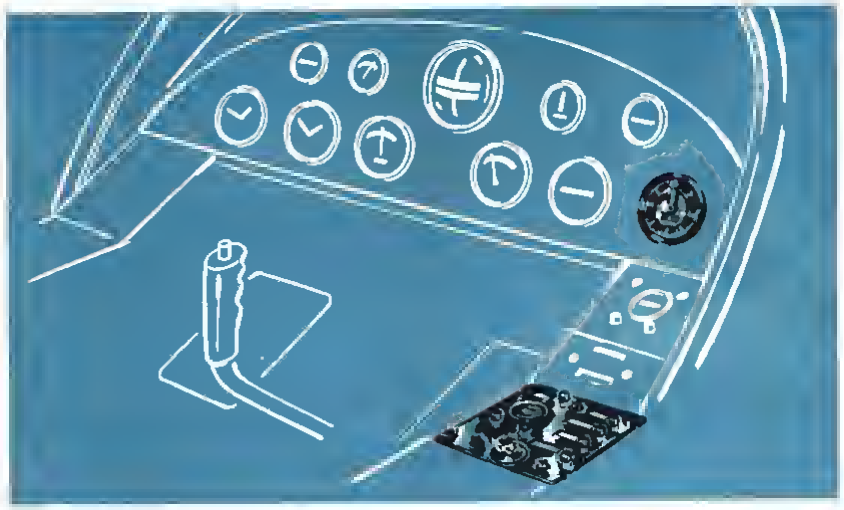


Indicates remaining distance to objective and its bearing.

Flight program is on a linear vector basis for short range navigation applications.

Apart from this, the Clifton Precision Plane Navigator incorporates essential features of the Long Range system.





Years of experience in the manufacture of high accuracy synchras have led us to the design and manufacture of *lightweight* Automatic Dead Reckoning Navigational Systems based on synchro computing elements.

Presentation in both systems is on a Rho-Theta basis for pilot convenience. Both systems transmit XY for automatic plotting table data.

The Long Range system, through solving the spherical problem, obviates errors that amount to as much as 40 to 100 miles and permits continuous automatic correction for magnetic variation.

Dead Reckoning based entirely on information available within the airplane. No need to break radio silence. Acts as a cross check on other navigational data at all times.

cppc

CLIFTON PRECISION PRODUCTS CO. INC.

CLIFTON HEIGHTS **PENNSYLVANIA**

Jet development tames flaming saucers...to squeeze more energy from fuel

Making flame do tricks—like taking the shape of a flat, stationary saucer—is part of the jet engine research at Westinghouse. By putting flame through its paces, engineers learn how to maintain fire in a small space to liberate the most energy . . develop smaller, more efficient combustion chambers and afterburners. Specialists meet frequently to discuss combustion problems and direct effort along the most productive lines

This flame research—one of a hundred avenues of aviation gas turbine development—is typical of Westinghouse corporate capability. Metallurgists investigate new heat-resisting alloys; casting engineers develop new precision methods and chemists work on new fuels and lubricants

These projects are just some of the *new* things going on at the Westinghouse Aviation Gas Turbine Division. They are all part of our program of jet engine development for commercial, military and missile use. All-out research and development is a Westinghouse contribution to turbojet design that is aimed at helping you bring tomorrow's aircraft . . . One Step Closer. J-91035

* * *

Basic research in fields allied to jet propulsion is a corporate function—carried on by persons such as this Westinghouse man. Your AGT sales engineer thus is backed by the corporate capability of all of Westinghouse as well as specific AGT Division facilities and experience.

THE WESTINGHOUSE AVIATION FAMILY

Jet Propulsion • Aircraft Electrical Systems and Motors • Airborne Electronics • Airborne Systems Components • Wind Tunnels Airport Lighting • Ground Electronics

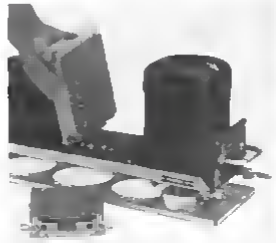
YOU CAN BE SURE...IF IT'S

Westinghouse

Flying test beds like this B-45 airplane are used to test new designs *in the air*. Flight testing is the ultimate proof of the value of a new design.

These two development engineers are evaluating a new fuel nozzle. The equipment in the background is designed to test the performance of fuel systems.

This is Allan U. Macartney, your Aviation Gas Turbine sales engineer in the Dayton, Ohio, area. He is THE MAN WITH THE FACTS. Contact Al or his counterpart in your area for FACTS on Westinghouse and Rolls-Royce engines and designs or write to Westinghouse, P. O. Box 288, Kansas City, Mo.



TRANSISTORIZED amplifiers, on plug-in printed circuit boards, are used throughout Nafi.

to William P. Lear, who conceived and pushed the Nafi development.

In an emergency, where every second counts, a pilot may become confused by the conflict between his instinctive and learned impulses, resulting in hesitation or incorrect stick movement, Lear believes.

Proving A Point

To demonstrate the instinctive nature of Nafi, Lear enjoys taking a visitor on a flight for a direct comparison. Once in the air the visitor is instructed to close his eyes while Lear maneuvers to confuse his passenger finally putting the plane into a climbing or diving turn. When told to open his eyes the visitor's task is to level out the plane.

In the first trial run, the visitor uses a conventional horizon indicator to orient himself, while the Nafi is used in the following trial. (This was not part of the demonstration to AVIATION WEEK.) Lear reports that even trained pilots react faster and more surely to the Nafi presentation, despite its newness and despite their long years of experience using conventional horizon displays. Lear also says that pilots find the three-in-one Nafi presentation less fatiguing because it saves them scanning two separate indicators.

Easy Turns

Unlike conventional directional gyros, where most of the compass card is masked except for the top sector, Nafi exposes the numerals (but not the graduations) of the entire compass card. (See photo, p. 54.) When the pilot wants to take up a new heading, no mental calculation is needed to determine whether to turn left or right. If the desired heading appears on the right-hand side of the compass dial, he turns right.

The bank angle pointer shows which direction the plane is turning. When the desired heading appears under the bank-angle pointer, the pilot merely

tracks off on the aileron to keep the two aligned—and the plane then comes out smoothly on the desired heading.

The first of 10 pilot production Naft systems Lear is currently building is being installed in a twin Beech owned by Reading & Bates Co. (Aircraftsmen Co. of Oklahoma City is making the installation). An experimental model also is under evaluation for helicopter use by Doman (AW Sept. 12, p. 34).

Behind The Indicator

The cockpit attitude-direction indicator (ADI) gets its signals from a remote ½ ATR size chassis which contains a directional gyro, vertical gyro and associated avionic controls. Up to four ADIs (using synchro repeaters) can be operated from a single remote gyro control unit to permit dual cockpit and cabin installations.

In pre-production evaluation models, the directional gyro has no magnetic slaving, a feature which Lear intends to add in production units. This involves the addition of a remote compass transmitter and a slaving amplifier which plugs into the main control chassis. When operated without slaving, the directional gyro drift rate is about four degrees per hour. A small cockpit controller enables the pilot to set in latitude compensation and set up initial heading in the ADI. The complete system weighs about 25 lb.

By using transistors throughout, Lear has been able to hold down power consumption. The system requires approximately 75 va. of three-phase 115 v., 400 cps. power, plus 12 watts of d.c., either 14 or 28 volts. Total starting power is 390 watts, running power is 195 watts. Production of the Lear Naft systems is estimated to be three to six months away.

Avionic Firms Report Sales and Earnings Up

Substantial increased sales and earnings during the first half of 1955 have been reported by several avionics manufacturers. Highlights of these reports follow:

• **Texas Instruments Inc.** announces net earnings for the six months period ending June 30 of 23 cents per share on sales of $12,991,191 as compared to 20 cents per share on sales of $11,616,810 for the same period in 1954.

These earnings are before provision for preferred dividends of $34,848, paid August 1 on 165,945 shares of preferred stock issued in May.

• **Barry Controls Inc.** upped its net income in the first half of 1955 to $180,515 or 61 cents per share, a 7% increase over last year. The com-

pany made its first public offering of common stock during this period.

Barry Controls Inc recently acquired the Insco Co, manufacturer of electro-mechanical control and testing equipment.

• **ElectroData Corp.** reports a gross six months income totalling $674,017, based on the sale of three and the lease of two Datatron electronic data processing systems plus revenue from the firm's computing center in Pasadena.

The company reports its greatest backlog of orders both for complete systems and auxiliary equipment. ElectroData expects to ship 12 additional computer systems in the last half of 1955.

▪ **General Controls Co.** showed a net profit for the six months period ending June 30 of $722,198, a 55% increase over the same period in 1954. The earnings on common stock amounted to 86 cents per share, compared to 67 cents per share in 1954. In June the company sold 60,000 common shares. Sales for the first half of this year were $12,349,621, a 49% increase over the same period in 1954.

▪ **Varian Associates** report net earnings of $105,000 on sales of $1,750,000 for the quarter ending June 30—78% increase over the previous year. Nine months earnings of $282,000 on sales of $5,018,000 were more than double that of the same period last year, amounting to 28 cents per share. Backlog, mostly of klystron tubes, at June 30 stood at $5,013,000. Varian stock recently split 10 for 1, was offered to the public for the first time on June 16.

• **Avien, Inc.** declared an initial dividend of 7½ cents per share on their Class A capital stock. The dividend will be payable September 20 to holders of record on September 7. During June, Avien sold 99,800 shares of its Class A capital stock.

New Avionic Firms

Formation of several new avionics companies, and expansions of several established firms, have been announced recently. These include:

• **Frank R. Cook Co., Inc.,** Denver is the name of new firm headed by former director of aeronautical engineering at Minneapolis-Honeywell. New company already has several avionics projects underway, including lightweight transistorized communications equipment and an automatic battery for missiles.

• **Naylor Engineering Co.,** Grand Rapids, Mich., headed by Arthur F. Naylor, will specialize in inertial guidance equipment engineering. Prior to founding the company, Naylor was employed by Lear, Inc., where he directed the de-

velopment of gyro stabilized platforms Company address 208 Kingswood Dr S E

• **Gulton Manufacturing Co**, Metuchen, N J, has established an Engineered Magnetics Div at Culver City, Calif, for the development and manufacture of magnetic amplifiers and power supplies

• **Norden-Ketay Corp**, New York City, has purchased the Frohman Manuf Co, Inc, of Miami, including company's Turbine Products Div of Boca Raton, Fla The new addition makes precision high-speed shafts, gears, and gear trains for jet engines and instruments, and is expected to gross $1 5 million this year

• **United-Carr Fastener Corp.**, Cambridge, Mass, has acquired Graphik-Circuits of Pasadena, Calif and Plastic Process Co., of Los Angeles. Graphik Circuits, which makes printed circuit boards, becomes a division of Cinch Manuf Corp, United Carr's Chicago subsidiary Plastic Process, manufacturer of extruded plastic components becomes a division of Monadnock Mills, a United-Carr subsidiary in San Leandro, Calif

• **Texas Instruments, Inc**, has opened a Mid-America marketing office, at 7001 West North Ave, Oak Park, Ill

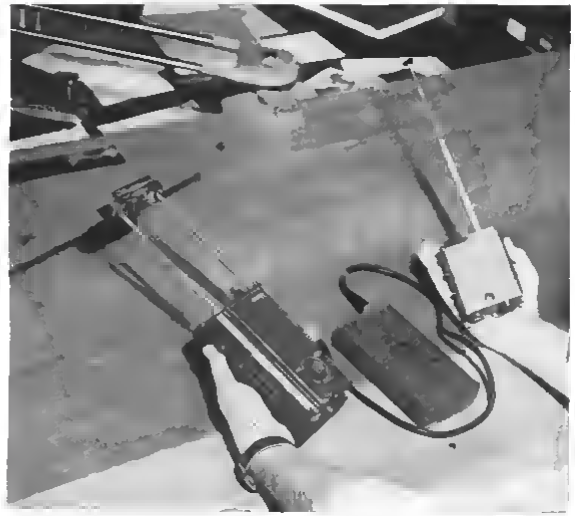
NEW AVIONIC PRODUCTS

Lab Equipment

• Broadband sweep generators, Type HTS, give panoramic display of several hundred megacycles Model 1319 displays frequency range of 1 35 to 1 95 kmc, while Model 813 covers 845 to 1,375 mc Applied Research, Inc, 163-07 Depot Road, Flushing, N Y

• Wide band amplifier Model 854A, provides two fixed voltage (10 and 100) over the frequency range of 10 cps to 1 mc, or up to higher frequencies with slight loss of uniform response Unit introduces less than 1% distortion Shasta Div, Beckman Instruments, Inc, P.O Box 296, Station A, Richmond, Calif.

• 'Zero-lag' power supplies, reportedly eliminate usual 200 to 500 millisecond time lag between a step change in line voltage or load and power supply recovery Manufacturer says output voltage never leaves the regulated region Standard regulation is 0 5% for a 20% static change in line voltage, static load changes of 100%, dynamic line changes of 10% and dynamic load changes of



New Emergency Radio

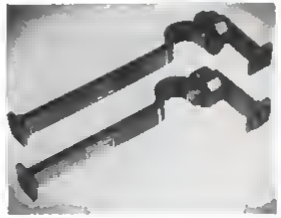
Improved miniature emergency radio—it weighs 15 ounces, its batteries, two-and-one half lbs—has been developed by the Air Research and Development Command. The unit, designated the URC-11, will transmit voice or signal messages 50 to 100 miles and will be used primarily by fighter pilots who must carry all their survival equipment in one seat-style kit.

25%. Ripple is under 0.1%. Thirty stock models are available covering the range of 4 to 160 volts, 4 to 100 amps. Catalog Z-5 describes complete line. **NJE Corp., 345 Carnegie Ave., Kenilworth, N. J.**

Microwave Components

● Low-pass coaxial filters, for use in the region of 100 to 2,000 mc., have insertion loss of less than 1 db. Series LS rises to 60 db within 25% of the cut-off frequency, while Series LF rises within 13%. Filters are rated 100 watts, measure 3 to 8 in. long and weigh 5 to 9 oz. Standard cut-off frequencies available are 100, 200, 400, 700, 1,000 and 2,000 mc. **Microphase Corp., Box 1166, West Acton, Mass.**

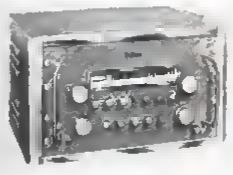
● High power X-Band rotary joint, Model H250R, nominally rated at 250 kw., reportedly does not break down until approximately 700 kw. Maximum VSWR of 1.10 is maintained over



frequency range of 8.5 to 9.6 kmc. Full 360 degree rotation is provided. **Litton Industries, Components Div., 336 No. Foothill Rd., Beverly Hills, Calif.**

Communications Equipment

● Superhet receiver, Model 201, reportedly provides intelligible reception of CW and ISK teletype transmission when noise level is 1,000 times greater than the signal. Receiver employs novel noise suppression techniques, covers frequency band of 1.6 to 31.4 mc., 540



to 1,600 kc., and 180 to 430 kc., if required. Sensitivity for CW is quoted at 1 microvolt for 10 db S/N and

½ watt output. Corresponding figure for AM is 3 microvolts. Hoffman Laboratories, Inc., 3761 So. Hill St., Los Angeles 7, Calif.

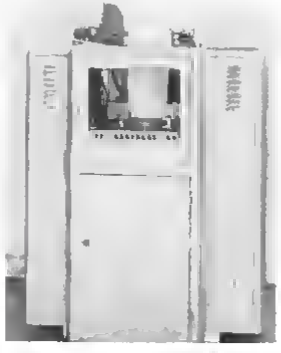
● Miniature microphones for high intelligibility reproduction may be designed to have a smoothly rising response characteristic from 300 to 2,000 cps, levelled off at approximately 3,500 cps. One model employs differential noise cancelling techniques for rejecting unwanted background noise. Units weigh less than 1 oz., are available with impedances of 1 to 6,000 ohms. Amplivox Limited, 2, Bentinck St., London W. 1, England.

● Vehicular voice communication set, Model 3 A M, operates in the 148 to 174 mc band. Transmitter delivers 20 watts and employs speech clipping. Receiver reportedly has minimum detectable signal level at least 31 db below one microwatt. Transmitter and receiver are crystal controlled, with stability of 0.003%. System is packaged for mobile use. West Coast Electronics Co., 5873 W. Jefferson Blvd., Los Angeles 16, Calif.

Computers & Data Processing

● Digital computer building blocks called 3C BLOCs can be assembled to perform a variety of digital operations, including arithmetic computation, storage, programming and logical decision, at a 1 mc pulse repetition rate. The 3C BLOC consists of 15 gating packages and one synchronizing clock package. Function performed by each unit is determined by plug-in connections made on jumper board. Units are designed for mounting in a standard 19 inch high relay rack and require a 7 inch panel height and 9 inch depth. Computer Control Co., Inc., 92 Broad St., Wellesley 57, Mass.

● High-speed flying typewriter capable of printing out 36,000 alpha-numerical characters per minute or 72,000 strictly numerical characters per minute, employs magnetic core memory storage to reduce number of vacuum tubes to less than 300. Device includes its own high speed magnetic tape handler in order to fully utilize printer's capabilities. However data can be fed to the printer from either punched tape or



directly from a high-speed digital computer. Company also announces a perforated tape reader with tape speeds up to 60 in./sec., start and stop times of 5 milliseconds, and character readout of up to 600/sec. Unit is identified as Model 903. Potter Instrument Co., Inc., Great Neck, N. Y.

● Read Record head, for magnetic storage drums, Model M11 10 A, requires a recording current of less than 20 ma.,

gives a readback voltage greater than 0.5 volts. Device has a resonant frequency of over 500 kc, core width of 0.04 in., and gap width of 0.001 in. Device is completely encapsulated. **Librascope, Inc., 808 Western Ave., Glendale, Calif.**

Production-Line Testers

● Tolerance indicator, Type KZS, for speedy testing of resistors, capacitors, and inductors by comparison with an external standard, is available with four different tolerance ranges providing deviation sensitivity up to 2½% of full scale. Device can be used to measure 10 ohm to 1 megohm resistors, 10 $\mu\mu$fd to 1 μfd capacitors, and 100 μh to 2 mh inductors with accuracy of 5% of full scale. **Federal Telephone and Radio Co., 100 Kingsland Road, Instrument Div., Clifton, N. J.**

● Gyro rotor end-play micrometer, Model 103-5, provides accurate measurement of bearing pre-load without physical contact, by means of an ionization transducer. Device has a sensitivity of 0.00001 or 0.00005 in. per division. Manufacturer also makes a small portable dynamic balancer, Model 211, capable of detecting unbalance of high speed rotors to 0.00001 in.-oz. Unit can handle any rotor which can be electrically driven at 10,500 rpm or higher. **Decker Aviation Corp., 1361 Frankford Ave., Philadelphia, Pa.**

● Electronic scanner, capable of monitoring up to 25 production points at the rate of one or five points per second, indicates by red or green lights whether each point is within prescribed operating limits. Device can be used to monitor temperature, flow, pressure, or level. Device is being used in a jet engine plant to check gear box temperatures during final tests. **Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 No. Fourth St., Philadelphia 33, Pa.**

FILTER CENTER

▶ **Spin-Off At Hughes**—Watch for Hughes Aircraft to set up its Semiconductor Division as a completely separate operation, to divorce it from parent company's higher systems engineering overhead.

▶ **Scatter Communications Tests**—New technique for transmitting UHF and microwaves beyond line of sight, called "scatter communications" will undergo evaluation by Collins Radio under Army Signal Corps sponsorship. Tests will be conducted at Army Aviation's proving ground, Ft. Huachuca, Ariz. Collins is setting up a small lab and office at Tucson, to be staffed by about 20 people.

▶ **New High Frequency Transistor**—Another new type of transistor called the diffused-base type, appears to hold promise of raising transistor operating frequencies up to 500 mc or higher. Some semiconductor experts think the new diffused base transistor shows more promise than the high frequency intrinsic-barrier type.

▶ **Poor Man's Autofab**—General Mills is developing a low-cost version of its Autofab automatic component placement machine (AW Mar. 21, p. 60) which is expected to sell for only $10,000. New "poor man's Autofab" is intended for use by makers of avionics and small-run electronics. Printed circuit boards will be inserted manually.

▶ **Decca Evaluation**—Army Aviation is setting up a small Decca chain at its Ft. Huachuca, Arizona, proving ground to evaluate its use as a navaid for Army liaison planes and helicopters. Navy reportedly has completed a similar evaluation. Decca proponents are try-

ing to get a Decca chain set up in the Los Angeles and New York areas to demonstrate its usefulness as a copter nav-aid.

▶ **Helicopter Radar**—Office of Naval Research is sponsoring a feasibility study on the use of K-band radar as a helicopter nav-aid at Bendix Pacific.

▶ **Two TVORs for Kentucky**—The Kentucky Department of Aeronautics has bought a new Wilcox 50-watt TVOR and marker beacon for installation at the Capital City Airport in Frankfort. A second installation is going in at the Owensboro-Davies County Airport.

▶ **New WADC Computer**—A new million dollar electronic differential analyzer, called the largest single integrated machine of its type, is under construction by Reeves Instrument Corp. for installation at Wright Air Development Center. The new computer, which will contain over 400 operational amplifiers, will increase WADC's computational facilities fourfold. Component accuracy will be 0.01% compared to the normal 0.1%. Built-in devices will detect and pinpoint malfunctioning components.

▶ **Pressurized Tacan**—Ruggedized version of the airborne Tacan receiver, under development at Collins Radio, unlike units now in production, will be pressurized to permit operation at extremely high altitudes.

▶ **Microwave Transistor**—Bell Telephone Labs reports a new high in transistor operating frequency with an experimental junction tetrode which has been oscillated at frequencies above 1,000 mc. The higher frequency comes from a 10-fold reduction in the width of the center P-layer, which measures less than 0.0002 in. wide.

▶ **Digital Flight Simulators**—Watch for the application of digital computer techniques to aircraft flight simulators of the future in place of long-used analog computing techniques. Object is to make it easier and quicker to change simulator characteristics to match last-minute changes in aircraft aerodynamics.

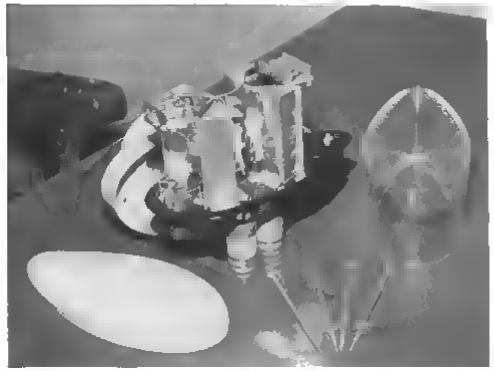
▶ **Electronic Lens Tester**—The Radio Corporation of America has announced a new electronic device which makes it possible to quickly evaluate and grade the performance of optical lenses in quantitative mathematic terms. Device will enable users to select specific grade lenses with exact characteristics required for a specific application, RCA says.

Avionics Bulletins

Recently announced bulletins and reports of interest to the avionics industry include

- **Analog-to-digital converter,** high-speed, with 0.1% accuracy. Eight page bulletin includes photos and block diagrams. The J. B. Rea Co., Inc., 1723 Cloverfield Blvd., Santa Monica, Calif.
- **Electronic microbrazer,** with timed heat cycle, for soldering small avionic assemblies and connectors. Catalog K-1 (6 pp.) Zephyr Manufacturing Co., Inc., 210 N. Hindry Ave., Inglewood, Calif.
- **Recorder,** for airborne or ground use, employs new technique in analog, digital and sequential on-off recording. Up to 212 on-off channels are possible on a five-inch chart. Riddition Inc., Melbourne, Fla.
- **High stability resistors,** glass sealed carbon film type, with stability quoted at 0.3% per year. Ask for PT 1,000. Pyrofilm Resistor Co., 8 Whippany St., Morristown, N. J.
- **Proximity meter,** a precision capacitance type guage which can be used to measure surface finish, concentricity, paint or insulation thickness, without touching the specimen. Technical manual TM 951-1 describes a variety of application. (28 pp.) Write to Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 No. Fourth St., Philadelphia 33, Pa.
- **Toroidal coil winding machine,** portable, for lab or factory use. Device handles wire sizes of AWG 26 to 44. (4 pp.) Arnold Magnetics Co., 5962 Smiley Drive, Culver City, Calif.
- **Magnetic storage element,** Type SR-11, extremely low-power, medium-frequency, and subminiaturized for airborne and missile use, is fully described in new product bulletin. Epsco Inc., 588 commonwealth Ave., Boston 15, Mass.
- **Four-channel bridge balance,** Type S-110, for coupling strain gages to direct writing oscillographs. Bulletin CED-1560 (2 pp.) Consolidated Engineering Corp., 300 No. Sierra Madre Villa, Pasadena 15, Calif.
- **Regulated d-c power supplies,** in a choice of 28 output voltages. Ask for Supplement 1A to Catalog 55. Lambda Electronics Corp., 103-02 Northern Blvd., Corona 68, N. Y.
- **Micro-miniature relay,** weighing less than ¼ oz. is described in four-page CEA-6346 available from General Electric Co., Schenectady 5, N. Y.
- **Miniature precision gaging potentiometers,** Series C-158, measuring 1⅜ in. dia. are described in Bulletin C158-455. Electronic Sales Div., DeJur-Amsco Corp., 45-01 Northern Blvd., Long Island City 1, N. Y.

ASSEMBLED Atkins Relative Danger Light weighs total of three-and-one half lbs



COMPONENTS of new warning light include aluminum cover, plexiglass shield, aluminum backage reflector vems and electrome tuning cucuits

Flashing Signal to Combat Air Collisions

A new type of aircraft light, designed specifically to prevent aerial collisions, has been developed in prototype form by William Atkins, a Northwest Orient Airlines' pilot.

Atkins says that seven companies including Northwest Orient have asked for units to service test on their aircraft.

Called a "relative danger light," the unit features three stroboscopic capacitor discharge type lamps which flash at different intervals—three times a second, once a second and once every three seconds.

Lights are grouped, with the fast flashing lamp in front, throwing its beam in an arc 60 deg. to either side of center; the once-a-second lights shine in two 60-deg. arcs to either side of the airplane, and the slow flashing lights cover the 120-deg. rearward arc.

Lamps may be housed together as a single unit, one or more of which can be mounted on a plane, or they may be installed independently of one another in nose, fuselage, empennage—wherever they give the best all-around coverage.

Madsen Lights, another anti-collision lighting system was also invented by a pilot and also uses high-intensity strobe lights. Developed by Capt. Andrew Madsen, a Transocean Air Lines' pilot, this system uses seven lights strung along the top and bottom of a plane's fuselage.

The bulbs flash in a rapid aft-to-forward sequence to indicate plane's direction of flight. They have been tested on a DC-4 and were recently approved by the Civil Aeronautics Administration as an anti-collision device for DC-3 aircraft (AW June 14, 1954, p. 80; Aug. 8, 1955, p. 29).

Collision Course?

The Atkins device gives a pilot an instantaneous and striking indication of the other plane's direction of flight, Atkins claims. It tells him at a glance whether he is on a collision course with another aircraft and so gives him the maximum amount of time to take evasive action. And the brilliant blinding white light emitted by the lamp stands out in strong contrast from the masses of steady and blinking red lights which clutter both ground and sky around a busy airport at night.

Early recognition of a collision course is becoming increasingly important because of today's fast piston and turbo-prop planes. Tomorrow's jet transports make rapid recognition even more vital.

Example: If two 360 mph. planes are flying a head-on collision course, they will cover the three miles visibility range (the minimum VFR standard) in 15 seconds. If the planes are going 300 mph., closing time is 17 seconds.

According to Atkins, it takes about three seconds for a pilot to react and move his plane's control surfaces after he has decided what maneuver to execute. He says that it takes a transport plane another 12 seconds to deviate from a given course once its flight controls have been deflected. Result: the pilot must be able to determine the other plane's course immediately so he can start getting out of the way fast.

As Atkins puts it: "If you waste several seconds deciding what to do, it is no longer necessary to take corrective action because you are going to be straining yourself unnecessarily and are going to die all tensed up."

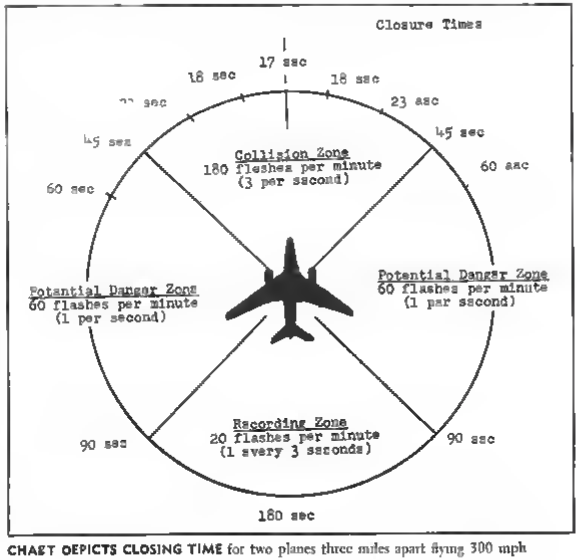


CHART DEPICTS CLOSING TIME for two planes three miles apart flying 300 mph.

Instant Recognition

Atkins thinks that his system of showing rapidly-blinking (180 times a minute) white lights—as bright as arc-welding flashes—to a pilot on a collision course will allow him instinctively and instantly to take successful evasive action.

If the pilot sees the slower, 60 times-a-minute signal, he will know that the other plane is flying a course about parallel to his. If the slow, 20 times-a-minute light shows, he knows there is nothing to worry about but he can still keep track of the other plane's movements.

Speed of today's aircraft is not the only reason why instant recognition of a collision course is mandatory to prevent an accident.

Here is another theory, advanced by Atkins, why a pilot must be jarred into recognizing a collision course as soon as another plane becomes visible:

If two planes on a collision course are traveling at the same speed and altitude, one plane, as observed from the other, will have no apparent movement and will stand perfectly still in the windshield. Aside from the fact that the other plane is getting relatively larger, there is no stimulus to sting the pilot into action to avoid the imminent accident. The sight of the rapidly flashing lights should do the job, according to Atkins.

Here are details of Atkins' lamp and how it works:

The lamp, if built as a single unit,

consists of an aluminum top cover, a streamlined Plexiglas shield body and an aluminum base.

Electronic timing circuits (there are no moving parts and no switch points to arc) are housed in the upper cap, bulbs and directional reflectors in the center body behind the Plexiglas condensers and transformers in the base.

Production light, designed to be mounted externally on an aircraft, will measure approximately 5 in. wide, 9 in. high and 11 in. long. Weight will be about 4 lb. and current draw 100 watts.

Atkins says that the duration of the light's flash is 1/1,000 of a second—too fast to cause contraction of the pupil which would result in partial blindness.

He adds that the lamp's brilliant light has almost unlimited visibility on a clear night. During daylight the light can be seen very well also. He cites an example of a test during a snow storm where normal visibility was ½ mile, yet the lights could be seen at ⅝ mile.

Visibility reports on the Madsen Lights state that the flashes can be easily seen 35 miles at night from the ground, shows up well at a range of 17 miles in a light rain and can be seen in broad daylight for several thousand feet.

The Atkins strobe lights electronic controls have been proved by endurance tests which have run through millions of flashes, the developer says. He points that the light is in actual operation only a very small fraction of total time.

Bulbs emit a cold light, similar to that of fluorescent tubes, eliminating heat dissipation problems.

Fills a Need

Atkins uses this argument to stress the need for his light.

Main reason for the few collisions recorded to date is because of the relatively small number of planes which fly in a very large air space. As the number of planes increases, the law of probability indicates that more collisions will occur, unless drastic steps are taken to avoid them.

Atkins cites these statistics: Since 1946, there have been 196 mid-air collisions involving civil aircraft. Since 1948, there have been 105 mid-air collisions.

"Of these collisions 86% occurred within five miles of an airport and 90% happened at or below 3,000 ft.

"Near airports, cockpit crews are extra alert, the tower provides up-to-the-second information about aircraft movements. Air Traffic Control and radar, airport and aircraft lighting—all conspire to eliminate mid-air accidents, yet near the airport is where the vast majority of collisions happen. Therefore, reasons Atkins, "there must be something wrong with the information that present aircraft lighting systems are giving the pilot."

The relative danger light will be manufactured by Research, Inc., a Minneapolis company which specializes in avionic products.

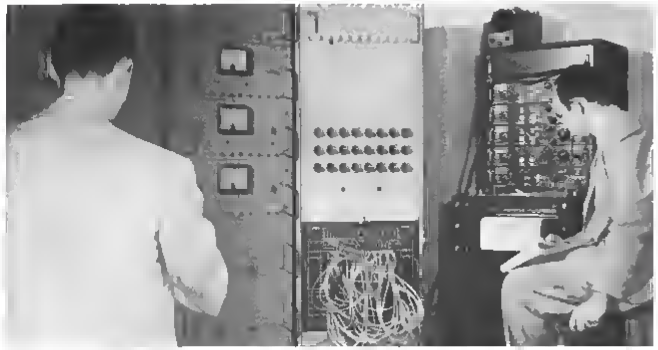
Neoprene Rubber Used In Woven Heating Units

For insulating tailor-made woven heating units for deicing applications, neoprene rubber is used where medium heat (200 F.) is required. The manufacturer reports that flexibility and good resistance to erosion and weather make neoprene ideal for deicing propeller blades, helicopter rotors, aircraft wings and spinners or as battery, antenna and rocket tube heaters.

Silicone rubber is used where higher heat is in demand as it vulcanizes into a resilient jacket that is heat-stable moisture-proof and oil resistant.

Over long periods it has excellent stability and flexibility through temperatures of from —80 to 500 F. without deterioration.

Safety Heat Elements, Inc., Middletown, Conn.



These Engineers are discussing the results of a simulated dynamic maneuver as calculated by an EASE analog computer.

TO THE ENGINEER WITH AN EXCEPTIONAL, INQUIRING MIND-

AFFILIATE WITH LOCKHEED'S STRUCTURAL LOADS GROUP

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WHO'S WHERE

(Continued from page 9)

Brig Gen Lance Call (USAFR) in charge of new Washington, D. C. office of Equipment Flight Test Div, Meteor Air Transport Inc

John E Schafer, Southern Div field manager of Pennacel Tape Corp

Glen S. Gipson, Western manager of customer relations of the Defense Div of Servel, Inc, Evansville, Ind **Roy F. Sheets**, purchasing agent of defense procurement

Rudolph F. Gagg, group executive staff engineer for Eastern divisions of Bendix Aviation Corp

W H. Crowley, chief engineer Kinney Manufacturing Div of New York Air Brake Co, Boston Mass **J. Raymond Marshall**, equipment sales engineer

John Rundt, chief engineer of the Division of Research and Development of The Timken Roller Bearing Co **Alva Kopatz**, chief draftsman

Guenther H Hille, sales engineer for Mallory-Sharon Titanium Corp, Niles, Ohio

R. G. Swanson, purchasing agent Wac Engineering Co Dayton, Ohio **L E. Scott**, sales and engineering staff

Leo J. Shannon, service manager of Chandler-Evans, Div of Pratt & Whitney Also promoted **H Cashen Mitchell** assistant field sales manager, **Sam Goodman**, assistant sales manager-administration and contracts

Eugene S. Carrara, manager of industrial relations Air France

Guy Valois, Quebec Region branch manager of Canadian Aviation Electronics, Ltd

Raymond O Davis, Miami station manager of Riddle Airlines

Ernest J. Williston and **O W. Lott**, Denver station service managers for United Air Lines

Mauricio Soares, special representative of Varig Airlines for the U S, Europe and the Caribbean

William J. Neff, manager of base facilities planning, Trans World Airlines

James C. Mabe, Jr., manager of plant operations for Chicago Pneumatic Tool Co.

Gordon W MacKinney, assistant to the general manager of the Propeller Div, Curtiss-Wright Corp. Also promoted **Robert J. McMinn**, manager-contract and order dept

Alexander F. Manuella, general superintendent of Hamilton Standard, Div of United Aircraft Corp Also promoted **Floyd V. White** production superintendent-machining **James I Vandergrift**, production superintendent of the Broad Brook plant

D. A Davis, purchasing agent of Textileather Div of General Tire & Rubber Co, Toledo Ohio

Harry L Artinger, Pittsburgh branch manager of Thor Power Tool Co

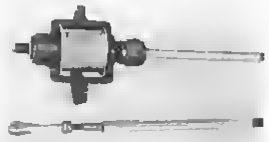
Anthony J Schoepf, Honolulu district sales manager for United Air Lines

Charles D. Brown, sales manager for General Electric's Light Military Electronic Equipment Department

C. E. Reid, small business liaison officer for Republic Aviation Corp

Dr. Walter G. Driscoll, assistant director of research at Baird Associates, Inc, Cambridge, Mass

NEW AVIATION PRODUCTS



Actuator for Trim Tabs

Lightweight linear drum actuator for trim tab control uses a threaded boss on the centerline to provide pick-up for flexible control. Sixteen turns of the drum will produce 2 in. of linear travel with 1/16 in. dia. cable. The assembly also contains a pick-up for a mechanical position indicator.

Avionic Product Engineering Corp., Route 46, Dover, N. J.

Wet Blast for Jet Blades

Automatic pressure wet blast unit for finishing jet engine compressor blades, handles both sides of the airfoil section at the rate of approximately 200/hr. removing heat treat scale and discoloration without stock removal or distortion. Unit incorporates a rinse facility to remove abrasive compounding after blasting.

Blades are manually loaded on simple work holding fixtures which grasp at the root. A conveyor indexes blades in the blasting chamber where a series of moving guns activated by an air hydraulic cylinder accomplish the finishing operation.

Cro-Plate Co., Inc., 747 Windsor St., Hartford, Conn.

Plessey Exhibits New Products

Aircraft equipment displayed statically at the recent SBAC Exhibition at Farnborough, England by the Plessey Group.

• **Pneumatic turbine starter, Type PTSA 50/40** operates from a 40 psig supply, with a time of about 13 sec. from the time the button is pushed until idling speed is reached for an air mass flow of 1.4 lb. sec. for a period of 10 seconds.

The pressure range is from 18 to 100 psig and temperature range is −90 to 300° C.

The starter weighs 15 lb. and allowing for ducting and quick-release air connections, the fly-away weight can be as low as 19 lb. per engine.

• **Regenerative type liquid-fuel starter** eliminates need for a pumping unit and can be employed to start the largest turbojet engines now in use, the maker reports. Iso-propyl nitrate liquid fuel is used. Starting is done using a small high-pressure air pressure supply for scavenging and the aircraft's batteries for h.f. ignition and control system.

• **Ram air turbine Type TRA 150/2** has been designed to provide hydraulic power for operation of essential flying controls under emergency conditions such as engine failure. The turbine automatically swings out into the air stream if the normal hydraulic supply fails but it can be housed within the airframe, air being supplied by ducting.

Unit operates at speeds up to Mach 1 at sea level. At speeds greater than 320 knots ram a built-in top speed control comes into operation.

• **Electric motor-driven hydraulic power pack** has a self-contained oil supply for the operation of essential services in the event of failure or damage to the aircraft hydraulic system.

• **Rationalized Jigmar offset linear actuator** is driven by a split field series wound motor developing 0.03 hp. at 15,000 rpm. and incorporates a disk-type electromagnetic brake to limit

over run. Unit weighs between 2¼ and 3 lb. according to the type of end fittings used.

• **Squirrel actuator** is a lightweight universal rotary type suitable for fuel cocks, valves and similar equipment. It is driven through an eight stage spur gear train powered by a 28 v. d.c. split field series motor. Output shaft revolves at 7.5 rpm. under normal working load (50 lb./in.). Maximum working load, 75 lb./in. Unit weighs 2 lb. 7 oz. and is fully tropicalized.

Plessey International Ltd., Ilford, Essex, England

Correction

Information supplied by a representative of Radiation, Inc., Melbourne, Fla., stated that the company's R1021-D airborne recorder (AW Aug. 22, p. 84) included a voice channel. We have since been informed by the firm that this feature is not included in this product.

AVIATION WEEK

Buyers' Guide

A McGRAW-HILL PUBLICATION

Brings A Unique, Long-Needed Publishing Service to the Aviation Industry

November 28, 1955, an all-important, needed publishing service will be available to the aviation industry — AVIATION WEEK's Annual BUYERS' GUIDE. The dramatic development of aviation into today's multi-billion dollar giant—reaching into all phases of manufacturing—demanding a constant flow of products and materials from tens of thousands of separate suppliers—has made a comprehensive, complete source book of suppliers and manufacturers a must for all segments of the Industry. AVIATION WEEK's BUYERS' GUIDE answers this intelligence need with an information service of year-'round usefulness, placed directly into the hands of some *57,000 key aviation engineers, management men, design and purchasing personnel—men who make up aviation's real buying influences — in the industry itself, in the Air Force, and throughout the Government.

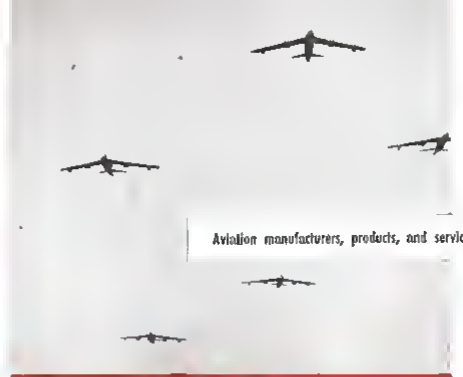
The latest developments in military procurement will be covered in a special report. Included in the detailed information to be presented will be Air Materiel Command—Air Research and Development Command buying practices, personnel listings—by name, procurement centers, etc; All-inclusive listings of manufacturers of aeronautical and allied products, sectionalized for maximum utility under six major headings: **Aircraft, Missiles, Avionics, Supporting Groups, Nuclear Power Systems, Airlines and Airports.**

Indexing is set up to provide quick, easily referred-to locators for all products. In addition, advertisements and product listings will be keyed to each other for ready reference. AVIATION WEEK's BUYERS' GUIDE also will carry Trade Name and Distributor listings—making this publication **the most complete single source of buying information available to the aviation industry today.**

Every AVIATION WEEK subscriber will receive the BUYERS' GUIDE. That's a market of some *57,000 key aviation people — plus substantial bonus circulation through the sale of extra copies of the BUYERS' GUIDE to aviation companies and government agencies (Price for additional copies is $3.00 each). AVIATION WEEK's BUYERS' GUIDE will be read, referred to, and depended upon constantly wherever aviation business is transacted.

MISSILES:
Airframe and components
Equipment, including ground-handling,
Powerplant

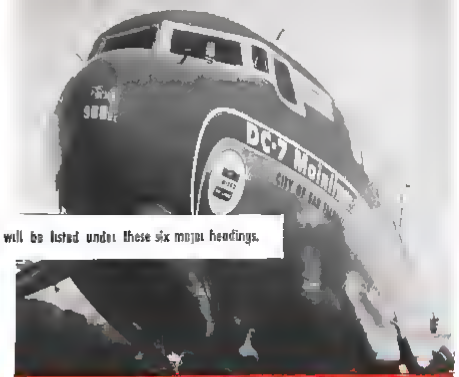
SUPPORTING GROUPS: Data systems, computers, punch-card systems etc., Electrical, Ground equipment, Hardware, Hydraulics, Instrumentation, Materials including fuels, chemicals, plastics, metals, etc. Tooling including machine tools, optical jigging systems, hand tools



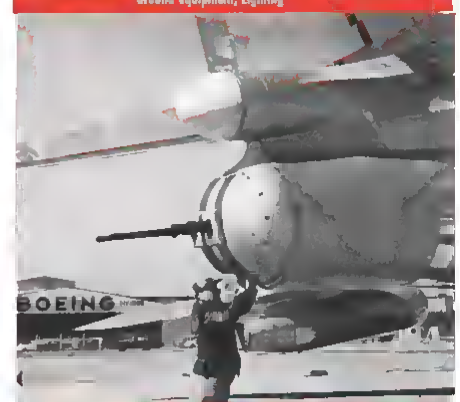
Aviation manufacturers, products, and services will be listed under these six major headings.

AIRCRAFT:
Airframe and components,
Landing gear, Powerplant
Armament, fixed equipment

NUCLEAR POWER SYSTEMS:
Accessories and components
Design services
Reactor fabrication



AIRLINES AND AIRPORTS:
Scheduled carriers, Non-scheduled carriers, Cargo carriers,
Ground equipment, Lighting



AVIONICS: Communications systems & equipment, Under-fire control systems & equipment, Instrumentation and controls, Navigation systems & equipment, Components and devices, Test equipment, Computers & data processing equipment

Be sure your complete line of products and services is listed in this basic book of buying information. Special discounts are offered for multipage and catalog-type advertisements. Your AVIATION WEEK representative will gladly help you plan your advertising to make the most economical and resultful use of the GUIDE. Call him today.

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AVIATION WEEK

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ALSO ON THE MARKET

Hot-air ground service coupling for jet engines has low pressure high flow, compressed air coupling by both remote and local actuation and interchangeability through a wide selection of installation and hose fittings—E. B. Wiggins Oil Tool Co., Inc., Los Angeles 23, Calif.

Day-Lo closed central water system and coffee maker supplies instant-coffee for aircraft. Unit comes in two sizes. Model CWS 2 which fits into a space for two 2-gal. type jugs, and Model CWS 3 which occupies space for three 2-gal. jugs. The system can be adapted to dispense soup, fruit-juices and carbonated drinks—Day-Lo Co., 2113 Colorado Ave., Santa Monica, Calif.

Non-abrasive grommets, S11154, for use in aircraft and electronic applications, are chemical and heat resistant. Available in Teflon or nylon, they have a temperature range of from −110F to +300F and will accommodate sheet thicknesses from 0.025 to 0.125 in.—Shamban Engineering Co., 11617 W. Jefferson Blvd., Culver City, Calif.

New line of VF controls comprise single, integrated packages for precise regulations of both voltage and frequency of motor alternator sets and inverters. Available for 60 and 400 cycle output, the control permits operation of a.c. equipment on aircraft—Electric Regulator Corp., 314 Pearl St., Norwalk, Conn.

Pullmax P-7 sheet metal and plate working machine has eight different speeds and uses stationary lower tool and reciprocating upper tool for cutting different sizes and shaped louvers. Power from 3 hp. motor makes possible straight cuts and louver cutting, dishing, beading, joggling and edgebending—American Pullmax Co., Inc., 2455 N. Sheffield Ave., Chicago 14, Ill.

SaberSaw hack saw attachment for air or electric drills operate without gears on an ill ball-bearing reciprocator which whips the blade back and forth—Thor Power Tool Co., 175 N. State St., Aurora, Ill.

New **bonded resistance wire strain gages** are now available.

Type ABF-7, with ¼-in. grid length may be used in place of wire-wound type.

Type EBDF-7T+ with ¼-in. grid length, is self-compensated for use on titanium.

Type EBDF-13Q+ self compensated

&in grid length for minimum response to temperatures between 50f and 250f when cemented to quartz —Baldwin-Lima-Hamilton Corp , Philadelphia 42, Pa

Multi-head abrasive belt grinder Model 630, for wet or dry grinding and polishing of ferrous non-ferrous and plastic materials can also grind and deburr flat surfaces on a high volume basis Speed of the belt can be adjusted from 5 to 30 ft. per min —Englesburg Uhler Co , Syracuse, N Y

New swivel joints have clamps with cadmium-plated steel for rust resistance Permanent clamp type Junior Joint #1 is said to prevent hose kinking the adjustable controlled torque type Junior Joint #2 offers quick positioning and locking of lines —Chicksan Co , Brea, Calif

Digital voltmeter 33-110 SADIC has a sensitivity such that 10 millivolts provides full scale digital output The analog to digital unit operates on self balancing potentiometer principle and has 1,000 discrete balance positions —Consolidated Engineering Corp , 300 N Sierra Madre Villa Pasadena 15, Calif

Rotary selector switch for tap transfer or selective applications is rated at 30 amp , 230v a-c , and can be furnished with up to five poles In JD type with positive detent action, rotor movement can be limited to any number of positions up to eight; in the JS type, coiled spring mechanism provides snap-action make and break —Electro Switch Corp , 167 King Ave , Weymouth 88, Mass

Subfractional motor with three-inch diameter frame has completely cylindrical rotor with no slot openings for uniform torque and quiet operation Stator has insulated slots with distributed windings —Holtzer Cabot Motor Division National Pneumatic Co., Inc , Boston, Mass

The "JT" line of lock and eject collet-type **of compression and tension tap holders** compensate for variations between the feed of the spindle and the lead of the tap and have been particularly developed for use on multiple spindle machines which take adjustable

adapter shank tools. The holders eliminate the need for lead screws on many tapping operations. Compression tap holder should be used when the spindle feed is greater than the tap lead while the tension tap holder should be used when spindle feed is less than the tap lead.—Scully-Jones & Co., 1901 S. Rockwell, Chicago 8, Ill.

Self-locking nut is designed for high temperature applications in aircraft and under severe vibration conditions. Available in low-carbon, medium-carbon and stainless steels.—Shur-Lok Corp., 614 S. Spruce Rd., Fullerton, Calif.

High speed resin bonded wheels and points are designed to operate at 20,000 rpm and above. Wheels are coded to indicate the degree of hardness of the bond and are available in standard grits from 24 to 120 and sizes and shapes to conform to national standards.—American Diamond Saw Sales, 120 N. W. Ninth Ave., Portland 9, Ore.

Heavy-duty Titan toggle clamps feature completely replaceable parts forged steel components holding pressures up to 4,000 lb. Weighing 4½ lb. clamps are available in two models. Model 557 is recommended by the manufacturer wherever overhead clearance is limited, Model 558 where clearance allows for use of an upright handle.—Detroit Stamping Co., 302 Midland Ave., Detroit 3, Mich.

Automatic welding head, designed for the Aircomatic process, has a single motor drive. New head has a continuous current rating of 600 amp. 800-amp. TCV rectifier arcwelder designed for inert gas shielded consumable electrode welding, features constant arc voltage for all automatic machine welding applications employing constant speed wire feed. The arcwelder contains a three phase transformer and a rectifier bank.

Flame cutting machine No. 42 Cameograph, features a permanent magnetic roller and cuts any shape up to a full 42-in. circle and straight lines to 92 in.—Air Reduction Sales Co., 60 E. 42 St., New York 17, N. Y.

Midget Dryer is completely automatic, electrically regenerated and of compact design for wall or bench mounting. Unit provides low cost dependable drying for compressed gas systems.—Industrial Corp., Roselle Park, N. J.

Mechanical remote controls feature a special push-pull cable with a helical outer wrap which provides teeth to engage hobbed wheels placed wherever it is desired to rotate a shaft.—Teleflex Inc., P.O. Box 218, North Wales, Pa.

Eastern Plans $350 Million Expansion

Rush for U. S. turboprop aircraft gains momentum with order for 40 Electras; jet decision deferred.

The long predicted rush by U. S. airlines for American turbine aircraft gained momentum last week as Eastern Air Lines announced plans for a $350 million fleet expansion program designed to carry it on into the jet air-travel era.

Following the earlier lead by American Airlines (AW June 13, p. 12), Eastern's program includes an order for 40 Lockheed Electras at a cost of $100 million and an option on 30 more.

Other plans in the three-stage program announced by EAL board chairman E. V. Rickenbacker:

• **Completion** of orders totaling $125 million for current piston engine equipment. These orders will bring Eastern's DC-7B fleet to 40 airplanes and include 10 Lockheed Super G Constellations.

• **Budgeting** of $125 million for purchase of 20 turbojet transports. No decision has been announced on which jet transport design Eastern will buy.

At the same time National Airlines and the Flying Tiger Line placed orders totaling $24,250,000 for additions to their piston engine fleets.

Flying Tiger placed a $20 million order with Lockheed for 10 L-1049H air freighters, the largest commercial order for cargo aircraft in aviation history.

National Airlines has bought six Convair 440 Metropolitans at a total cost of $4,250,000.

New Finance Plan

Eastern's five-year program, termed the largest ever undertaken by an airline, will be financed through a long-range plan Eastern expects will set the industry's pattern for the transition from piston to jet equipment.

Details of the financing program are incomplete, but Rickenbacker says it is a radical departure from the previous practice of using short-term bank loans. It is designed to provide capital as it is needed for the new equipment, but defers payment until the aircraft are in service and earning money.

"This will give the company a much wider latitude in the use of cash accumulated through the anticipated increased earnings, and from reserves for depreciation," said Rickenbacker.

Together with the much longer period provided for repayment of borrowed capital, this means that the company will be less restricted with respect to dividends and will, at the same time, be assured of the financial means for taking advantage of any advances by which air transport services may be further technically and profitably improved."

Eastern calls the DC-7B and Super G purchases a transition move to bridge the gap between current equipment and the coming jet era. The DC-7B aircraft will be used to promote first class traffic. The first eight are now in service, and deliveries are scheduled for completion early in 1958.

The Super G Constellations are planned for use in the Eastern-Braniff Airways interchange to South America. The 10 Super G Constellations will be delivered in 1956.

Second Electra Order

The Eastern order for the Lockheed turboprop airliner is the second announced for the airplane. American Airlines placed the first order last June for 35 Electras. With these two large orders on the books, Lockheed is expected to accept further orders from its smaller customers.

Delivery of the 40 Electras to Eastern is scheduled for the period between August 1958 and July 1959—roughly the same delivery period announced by American when it placed its order for 35 Electras.

Rickenbacker said that Eastern hasn't decided which engine and propeller it will use in the Electra, but it is basing its performance estimates on a 3,750 horsepower engine. He said engines of greater horsepower will be available by the time the Electra is ready to fly and that performance will be better than present estimates.

After three months of delay, American decided late last month to use the Allison Model 501 turboprop engine for its Electras.

By mid-1959, Eastern plans to operate all first class express services on main trunk routes with the Electras, freeing the piston aircraft for conversion to aircoach service. By the end of 1959 the carrier expects aircoach to make up 70% of its daily operating mileage.

Turbojet Problems

In announcing the expansion program, Rickenbacker declined to name the turbojet transport Eastern will buy,

United to Order 25 Jets

United Air Lines will place a $125 million order for 25 jet transports by the end of this month, according to United president W. A. Patterson.

In a speech in Cleveland, Patterson said his company will buy a jet transport which will carry 112 first class passengers or 150 coach passengers and 8,000 lb. of cargo. It will have a 4,800 mile range.

CAPTAIN RICKENBACKER signs Eastern Air Line's $100 million contract for 40 Electra airliners at New York meeting with Lockheed President Robert E. Gross.

SKETCH of the Electra in EAL marking shows the turboprop transport from a new angle

but the airline is planning to get a jet into service by early 1960.

Rickenbacker listed two major problems yet to be solved by manufacturers. One involves the perfection of a practical method of cutting jet engine noise and the other is development of an effective and dependable reverse thrust mechanism.

Eastern says the jet transport it will buy will have a gross weight of 220,000 to 230,000 lb and will carry 80 to 100 passengers first class and 120 to 130 passengers in aircoach configuration.

When the 20 unspecified jets are delivered, Eastern's fleet will total 218 aircraft.

New Gains Forecast

The carrier expects to have an annual capacity of nearly 15 billion seat miles in 1961, 160% more than the capacity of its present fleet.

Rickenbacker said that economic studies used by Eastern in planning its expansion indicate that air travel is going to move ahead at an accelerated pace.

He estimated that within a year after introduction of jet service across the nation, the airlines will pass surface carriers as the country's primary passenger carrier.

The Eastern board chairman based his forecast on the existence of untapped markets, plus population and business growth. He also points out that today there is a generation that has grown up in the air age and accepts the airplane naturally as the preferred means of travel.

Freight Schedule Cut

The L-1049H ordered by Flying Tiger Line is designed to carry a payload of 42,600 lb at a cruising altitude of 21,000 ft and a cruising speed of 335 mph. Range is 2,200 miles with a full load.

According to Flying Tiger president Robert W. Prescott, addition of the new aircraft will cut two hours off present transcontinental freight schedules, increase capacity 150% and cut direct operating costs more than 10%.

The National purchase of six of the new Convair 440 aircraft brings the carrier's fleet to 34, including 12 Convair 340s. The delivery of the $4,250,000 order will take place in June, July and August of next year.

National is having the new aircraft equipped with airborne radar to conform with standards on its current fleet.

The new Metropolitans will seat 44 passengers.

The National order brings total sales of the new Convair transport series to 52.

Electra Subcontractors Listed by Lockheed

Burbank—Lockheed Aircraft Corp. has set up the largest subcontracting program in its history for the Electra.

Four major firms have been chosen to build components for the Electra because of unusually heavy loads at Lockheed's facilities on tooling, engineering and production manpower and factory and office space.

"Lockheed decided upon this extensive program because of foreseeable business for the coming two or three years," vice president and general manager Burt C. Monesmith said.

Subcontracts for the transport went to:

- **Northrop Aircraft, Inc.**, to build the empennage.
- **Menasco Mfg. Co.**, to produce all landing gear.
- **Rohr Aircraft Corp.**, to provide power packages, the complete engine nacelle installations.
- **Temco Aircraft Corp.**, to manufacture wing flaps and ailerons.

"Lockheed will provide each subcontractor with the basic design and specifications," Monesmith said, "but they will be responsible for the rest of the work—detail engineering, planning, tooling and manufacture—on a given section of the plane."

The "foreseeable business" which Monesmith refers to includes a new F-104 contract "expected shortly" which will step up production to its "maximum" rate, continued production of the Navy's T2V-1, a sizeable backlog of work on radar early warning Constellations, and work on both passenger and cargo models of the commercial Super Constellation.

The company will have a mockup of the Electra ready this week for inspection by American Airlines executives who are arriving at Lockheed for a three-day visit.

Conference Asks Study Of Navigation Needs

Experimental flights in high density traffic areas to help determine future long range navigation aids was urged by a meeting of the Air Navigation Conference held at International Civil Aviation Organization headquarters in Montreal, Canada.

"Estimates for the North Atlantic indicate that, in the period from 1970 to 1975, peak traffic may amount to as much as 18,000 individual oceanic crossings per month and this traffic would crowd the airways and require aircraft to be flown with far less separation than at the present time. Improvements in the various facilities and procedures which insure efficient separation will be gradual rather than abrupt the series of actual trials is designed to show which direction of improvement is likely to prove the most productive," the conference noted.

The conference listed these minimum requirements for the aid:

- **Range** from any single transmitting unit of a ground based system should be about 1,500 nautical miles.
- **Position error** should not exceed 10 nautical miles at least 95% of the time through the entire area that is to be covered.
- **System must be reliable** at least 95% of the time during a flight of 10-hour duration.
- **The aid must be capable** of handling an unlimited number of users, and provide the pilot continuous visual indications which will permit him to follow the required track without further processing.

The conference was attended by technical experts from 34 nations and international organizations.

Capital: Viscount Results Good

The Vickers Viscount turboprop transport exceeded all expectations and operating costs have been below estimates, J. H. Carmichael, Capital Airlines president, reported last week.

Speaking before the Aero Club of Washington, Carmichael said that with only three Viscounts in service out of a total order for 60, the operational results since service began July 26 has bordered on the "fantastic." By the end of September more than 25,000 passengers rode Capital's Viscount flights, he said.

Capital's daily utilization of the three Viscounts has been 7½ hours and will be further increased to 8 hours and 50 minutes beginning with Oct. 30 schedule changes, according to Carmichael. During the two month period 480 Viscount flights were scheduled and cancellations were held to four with three due to weather and one to a mechanical problem. The mechanical cancellation could have been avoided, Carmichael said, "Had our people known that a needed starter replacement had been labelled by the British as one electrical unit."

Passenger acceptance of the Viscount has been tremendous, Carmichael said. There was on average passenger load factor of 82% during the first 15 days of operation, and at the end of 60 days on Sept. 26 the load factor was 84%. An added schedule in mid-August at the off-peak hour of 3:15 p.m. reduced the overall load factor to 78%, Carmichael said, but the average climbed to 84% by the end of September.

Another important factor in introducing the Viscount turboprop to the U.S., Carmichael noted, was the enthusiastic reception of the company's personnel.

He further stated the pilots were "high" on the plane. They are delighted with simplicity of the plane, particularly its maneuverability and were also pleased with the cockpit and the excellent visibility.

The operations and maintenance departments have been similarly impressed with the ease of handling the Viscount, Carmichael said, and introduction of underwing refueling from both sides, which can be done in 10 minutes, will produce additional economies. On the basis of 60 days' experience the operating costs have been lower than expected, running almost 2 cents per mile less than estimates, he said.

Damon Says Low Fares Key to Air Growth

Introduction of the tourist fare was the greatest factor in the post-World War II air travel boom and is the key to future expansion, according to Trans World Airlines president R. S. Damon.

'Before 1951, we were in the airline business, since then we have been in the transportation business, thanks to low cost Sky Tourist travel," Damon told a meeting of the sales managers of the American Viscose Corp.

Damon said TWA is so confident of future air travel trends that his company is scheduling winter services at 80% of peak season schedules instead of making the substantial service reductions usually made for the winter season.

The time is not far off, Damon said, when the domestic airlines will carry more passengers more miles than all railroad pullmans and coaches, including suburban commuting. He also predicted that the international airlines will soon be carrying more passengers than all trans-oceanic steamships.

"The air tourist market today is the most rapidly growing segment of the total business," said Damon. "While I expect the first class markets ten years from now will be greater than they are today, I think their increase will be limited to the conversion of the remaining surface-bound passengers plus the population travel growth, and that the tourist market is still relatively unlimited and may still increase some tenfold in the next decade.

"The Department of Commerce estimates that the population growth of travelers in the next ten years will increase some 27,000,000 people within the United States, all of whom from their early youth will be well conditioned to air travel. I think the conclusions we can draw are that we will have a relatively limited further growth in first class travel and an extremely heavy further growth in airline tourist travel."

Damon told the group that TWA traffic specialists believe that within five

Civil Plane Shipments

Civil aircraft shipments during July, measured by airframe weight, reached 932,500 lb., Department of Commerce reported. Unfilled orders for civil aircraft of 3,000 lb. airframe weight and over amounted to 393 at the end of July, an increase of 60% over the backlog for the same time last year.

	1955		1954
	July	June	July
Completed Aircraft	354	538	293
By weight of airframe			
Less than 3,000 lb	333	505	273
3,000 lb and more	21	33	20
By number of places			
1 to 5 place	319	487	251
More than 5 places	35	51	42
By total hp., all engines			
Under 339 hp	301	469	257
400 hp and more	53	69	36
Total Value of Completed Parts (000 omitted)	$37,574	$42,550	$30,146
Aircraft, total	28,804	34,072	23,895
Less than 3,000 lb.	4,786	6,862	3,895
More than 3,000 lb	24,018	27,210	20,000
Aircraft parts	8,770	8,478	6,251
Total of Aircraft Engines and Parts (000 omitted)	11,124	11,917	11,398
Aircraft engines	4,146	4,329	4,845
Engine parts	6,978	7,588	6,553

Lower Coach Fares

Both United Air Lines and Northwest Orient Airlines last week offered new low coach fares between the Pacific North west, the Midwest and the East Coast.

The action came after Sen. Warren Magnuson (D-Wash.), chairman of the Senate Commerce Committee said he would hold hearings in mid-October on the subject of low coach fares for the Pacific Northwest (AW Sept. 26, p. 13).

Trans World Airlines, American Airlines and United now have $160 round trip fares between Los Angeles-San Francisco and East Coast points.

The Pacific Northwest fares—$76 to Chicago and $99 to New York—will become effective Oct. 27. This is a reduction of $13 in the fare to Chicago and $19 in the New York City fare.

years the ratio of tourist to first class will be 80 to 20. This justify this estimate on the grounds that last year 69% of the trans-Atlantic air passengers made use of tourist type accommodations.

TWA expects recent fare and service changes to produce substantial increases in traffic, according to Damon.

In his speech, Damon mentioned such factors as the new $80 excursion fare and nonstop transcontinental coach services among recently inaugurated features which are expected to sell air travel to the public as a basic transportation medium.

IMATA Wins Award For Safety Record

The Independent Military Air Transport Assn. has been presented the National Safety Council's Award because of its member airlines' record of 26 consecutive months of passenger carrying operations without a fatality.

Ramsay D. Potts, IMATA's president accepted the award from Ned H. Dearborn, NSC president. Civil Aeronautics Board Chairman Ross Rizley congratulated IMATA on its record.

Here is a breakdown of passenger traffic by IMATA member airlines for the period between July 12, 1953 and Aug. 25, 1955:

Airline	Passenger-Miles (000 omitted)
Transocean Air Lines	312,305
Seaboard & Western Airlines	311,604
The Flying Tiger Line	180,402
California Eastern Aviation	143,982
Overseas National Airways	73,868
Trans Caribbean Airways	59,139
Capitol Airways	54,976
American Flyers Airline Corps.	31,978
All American Airways	24,348
Associated Air Transport	11,695
Purdue Aeronautics Corp.	9,141
Slick Airways	4,949
American Air Export & Import Co.	1,414
Total	1,219,801

CAA Will Install 38 Repeater Scopes

Civil Aeronautics Administration's program for installation of repeater scopes has been expanded by an additional 38 units to be located at airports which are served by airport surveillance radar (ASR).

The new program will bring to 81 the number of repeater scopes that will be available at ASR locations. Installation of more electronic "eyes" for expediting aircraft safely into and out of airport terminal areas means that all of the airports in the program will then have a minimum of two scopes. The repeater scopes show aircraft in the sky from six to 50 miles around the airport, the image being transferred from the main ASR installation.

At locations where the heaviest concentration of instrument traffic is registered, the CAA plans to provide three scopes. At all radar locations, the scopes will be used for general surveillance approach control and departure control functions of terminal air traffic control.

Air India Gets 1049-Gs

Bombay—Air India International announced this week that it has ordered two Lockheed 1049-G Super Constellations bringing its Super-Constellation total to seven.

The two aircraft, an airline spokesman said, will cost around $2 million each and are scheduled for delivery early in 1957. An earlier order for a 1049-G for the sabotaged 'Kashmir Princess' in which several Chinese Communist officials lost their lives will be fulfilled in May.

With these additions, Air India hopes to extend its route structure to Australia sometime in 1957.

By that time it is also expected that the present flight from Calcutta to Tokyo via Hong Kong will have developed a branch service to cover Shanghai and Peiping under a new Sino-India agreement now being negotiated.

CAA Pilots Fly Jets

Twelve pilots from the Civil Aeronautics Administration have been qualified in jet aircraft. They are specialists in aviation safety and spent one month at Craig AFB, Ala. In addition to 30 hours of flight time in T-33 two-place jet trainers, the CAA pilots received training in engineering, navigation and communications as applied to high-speed jet transportation. CAA said the knowledge acquired will be used in preparing for the safety problems of the jet age in civil transportation.

New Brazil Route

Rio de Janeiro—Transportes Aereos Portugueses plans to begin weekly flights from Portugal to Brazil sometime in December, according to an airline announcement made here last week.

The announcement said that the airline plans to use Super Constellations for the flight which will go from Lisbon to Ilha do Sal, to Recife and Rio de Janeiro.

Southwest Airways First Feeder To Get Permanent Certification

Southwest Airways is the first local service airline to win permanent certification under terms of legislation enacted by Congress last spring.

Civil Aeronautics Board has issued a permanent certificate to Southwest authorizing service to 17 points on a permanent basis and to seven points for a three year period.

The CAB also decided to lift the suspension of United Air Lines at Monterey, Santa Barbara and Eureka, Calif., and to allow Southwest to operate shuttle service between San Francisco and Sacramento.

The investigation of the possible merger of Southwest and Bonanza Air Lines is dismissed by the Board since it doesn't appear that the two carriers can agree on an integration plan.

Traffic Increase Forecast

The decisions came in final action on three cases concerning Southwest—the Southwest renewal case, the Southwest permanent certificate case and a deferred portion of the Bonanza renewal case.

In the permanent certificate case CAB found that Southwest points meeting the standard for permanency are Los Angeles, Burbank Oxnard-Ventura, Santa Barbara Santa Maria, Monterey San Jose, San Francisco, Oakland, Sacramento, Marysville, Santa Rosa, Chico, Reddings, Eureka-Arcata and Crescent City, Calif., and Medford Ore.

Points certificated for a temporary three year period are San Luis Obispo, Santa Cruz Watsonville, Ukiah Fort Bragg, Red Bluff, Yreka and Stockton, Calif.

These points failed to meet the CAB standard of five passengers a day.

In the Southwest renewal case, which was started before permanent certification legislation was passed, CAB decided several issues not coveted in the permanent certificate case.

The major issue concerned service by United at Monterey, Santa Barbara and Eureka. United was suspended at these points to help Southwest in its developmental stages. Now CAB finds that United should be reinstated, since permanent certification indicates Southwest has reached an advanced point of development and in view of substantial traffic increases forecasted for the three points.

Shuttle Authorized

The Board has decided not to include in Southwest's certificate points where service has never been inaugurated or where service has been suspended for economic reasons.

Southwest is authorized to operate a shuttle service between San Francisco and Sacramento in line with board policy to encourage development of such short-haul services. The Board doesn't find that competition from Southwest on the route will damage United's similar service.

In reference to a proposed integration of Southwest and Bonanza, CAB notes that no effective plan has been presented for the merger and finds that a CAB finding on the subject would not serve any useful purpose.

In the Bonanza renewal case decision, CAB awarded Southwest a three year authorization for a new Los Angeles-San Francisco route via Palmdale Lancaster, Bakersfield, Monterey and San Jose.

Proposed route extensions for Southwest and Bonanza between Reno and San Francisco and between Las Vegas and Bakersfield are denied, as is a proposal for service by Southwest between Los Angeles and Apple Valley and Inyokern.

Herald Gets New Order

The first British order for the 44-seat Handley Page Herald shown above during a test flight, has been announced by Air Kruise, Ltd., an associate company of Silver City Airways. Air Kruise will purchase "no less than" six for London Paris Brussels service. Twenty nine Heralds already have been ordered for service in Australia and Latin America.

Small Plane Accidents Reach 312 in August

A total of 312 small-plane accidents were reported for August by the Civil Aeronautics Administration. There were 52 fatalities in 35 of the accidents.

Most small-plane accidents involved collisions with ground objects. A tabulation of small-plane accident reports received for August reveals these causes:

Collision with ground objects	77
Stall or spin	61
Groundloop	37
Overshoot	27
Undershoot	23
Hard landing	20
Nose up or nose-over	17
Collision with ground or water	14
Wheels-up landing	9
Collapse or retraction of landing gear	9
Airframe failure	2
Other	16
Total	312

North Central Gains

North Central Airlines reports a net profit of $35,402 in August, bringing the local service carrier's year-to-date earnings to $101,857. Profit for the first eight months nearly equaled North Central's entire profit of $111,707 in 1954 and compares to a loss of $32,889 in the same period last year.

North Central carried a record 48,159 revenue passengers in August for a passenger revenue total of $560,968. The 45% gain in August passenger traffic and revenue resulted in a 113% reduction in federal mail payments for the month, North Central reported.

CAB ORDERS

GRANTED

Ozark Air Lines leave to intervene in the Southwest Northeast service case.

Greater Peoria, Ill., Airport Authority leave to intervene in the investigation of the need for air service by Ozark Air Lines between Peoria and Fort Dodge Iowa.

Eastern Air Lines leave to intervene in the case involving renewal of Continental Air Lines' San Antonio-Houston route segment.

Leave to intervene in the investigation of the need for service by Ozark Air Lines between Peoria and Fort Dodge to the Illinois Department of Aeronautics and the City of Galesburg, Ill.

APPROVED

Agreements between American Airlines, National Airlines and various other carriers relating to inter carrier arrangements.

ORDERED

Proceeding involving suspension of the letters of registration of Air Cargo Express, All American Airways Coastal Airlines and Pacific Alaska Express terminated since its purpose has been accomplished or rendered moot by previous CAB action.

Northeast Airlines authority to suspend service at Bar Harbor Maine, from Sept 25, to Oct 31, 1955.

DENIED

Stewart Air Service's application for exemption authority permitting it to incorporate, without prejudice to its renewal in the Large Irregular Case.

Eastern Air Lines' petition for reconsideration of the CAB decision which denied petitions for expansion of the Texas-California interchange case.

SHORTLINES

▶ Alaska Coastal Airlines has been renewed for three years by the Canadian Air Transport for operation as a international charter carrier. The carrier is licensed to operate from Alaska to points in British Columbia and the Yukon Territory using aircraft that have a disposable load of less than 6 000 lb.

▶ Compagnie Francaise du Pont Aerien-An Channel has been formed in France with the approval of both British and French authorities. The new carrier will use Bristol 170 equipment to ferry passengers and vehicles between France and Great Britain.

▶ Toronto, Canada, will have a central airline terminal to consolidate separate airline offices scattered through the downtown area. The new terminal will have bus facilities and is convenient to all major hotels.

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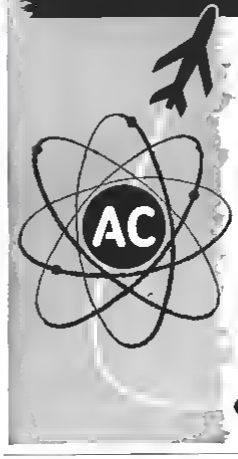

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EDITORIAL

Manhattan's Heliport Problem

New York needs a downtown helicopter terminal badly. This is the missing link that would generate genuine commuter service from the existing transport helicopter network that already taps suburbs in Westchester, Connecticut and New Jersey.

New York can get a downtown heliport that will be ready for operation within 30 days at a cost of only $50,000. The Port of New York Authority and all of the leading helicopter operational experts on both sides of the Atlantic agree that this is an excellent solution of the Manhattan heliport problem.

Political Roadblock

The only remaining roadblock is the political opposition of Mr. Vincent O'Connor, New York City Marine and Aviation Commissioner. Mr. O'Connor, an experienced lawyer but with little knowledge of aviation, opposes the Port Authority heliport because he has a project of his own that will cost the taxpayers $594,000, take considerably longer to build and offer less safety.

All the helicopter experts, the Port Authority and Mr. O'Connor agree that the foot of 30th St. at the Hudson River bank is an ideal location for Manhattan's first downtown commercial heliport. It is close to the West Side express highway, the Pennsylvania Railroad station, subway lines and the Post Office.

The essential difference between the Port Authority's proposal and Mr. O'Connor's, aside from cost, is that the former's heliport would be at ground level while the latter's would be on the 30-ft.-high roof of a marine freight terminal. Helicopter experts who have surveyed the 30th St. site agree that the ground level heliport offers good safety factors for the helicopter types likely to be operating during the next five years because they can remain in the 15-20 ft. ground cushion while maneuvering over the river.

The experts include Igor Sikorsky, Ansel Vemeuwe, sparkplug of Sabena's successful interurban copter network; Col. William Bunker, pioneer of Army helicopter service, and Robert Cummings, president of New York Airways which operates a transport helicopter service in New York, New Jersey and Connecticut.

Rooftop Safety Less

Mr. O'Connor's 30-ft. high rooftop heliport would put the helicopters well out of ground cushion for their landing and takeoff operation, removing a substantial safety factor.

Yet Mr. O'Connor has based his entire opposition to the ground level heliport on the ground that it is "unsafe" and that his 30-ft. rooftop port is "much safer."

This is patently absurd. In fact, the reverse is true. The ground level heliport offers a much larger margin of safety with current helicopters than does the rooftop proposal. It will continue to do so until twin engine helicopters with complete single engine performance are developed.

European Heliports

European experience with transport helicopter operations has proved that downtown heliports are absolutely essential for successful commercial operations. Without them, the helicopter loses its best selling point. Brussels, London, Paris, Rotterdam, Cologne, Bonn and Liege all have successful operating downtown commercial heliports.

Manhattan with its huge commuting and traveling population is the natural hub of the transport helicopter network now operated by New York Airways and a growing fleet of corporation owned helicopters used for executive transport. Eventually, Manhattan will need three downtown heliports, the second being located on the East Side and the third at the lower tip of the island.

For $50,000 the city can begin to get the valuable operating experience that will provide a sound guide for its future heliport expansion. It will also offer to its commuting citizens and the traveling public a new type of transport that is badly needed in the ground tangled traffic congestion of Manhattan.

The taxpayers of the rest of the country also have an interest in this problem. New York Airways is currently subsidized by the Civil Aeronautics Board through its developmental period. It will be impossible for New York Airways to fully develop its transport network and make its own way without subsidy and without adequate Manhattan heliports. The longer this is delayed the longer the taxpayers must shell out for subsidy.

The problem of the downtown heliport will be one of the toughest problems limiting future expansion of commercial helicopter operations. Without it a suburban or interurban transport network loses much of its utility for the traveling public. In Europe, airlines have successfully fought the political battle for landing rights in the heart of cities close to local ground transportation facilities.

Unless American operators fight and win this battle for the downtown heliport sensibly located with regard to economic and safety considerations and not those dictated by politics, they will face a difficult task in giving the people of this country the kind of transport helicopter services they deserve and need.

—Robert Hotz

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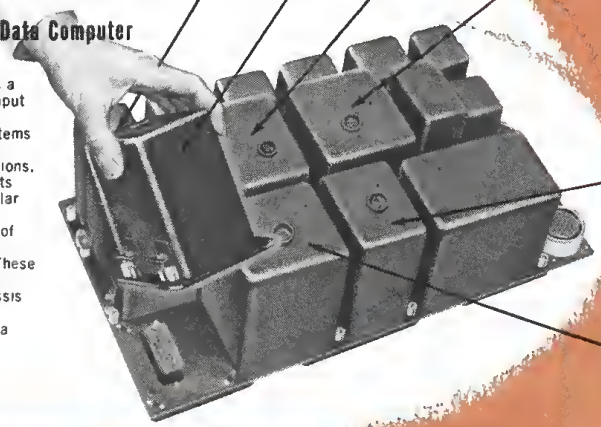
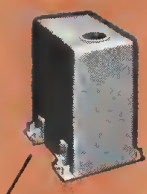
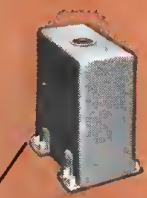


The Mechatron Master Data Computer

This typical sub-system provides a single coordinated source for input data required by the various control and instrumentation systems of an aircraft. This equipment is being produced in different versions, tailored to meet the requirements of specific aircraft. The particular arrangement of this equipment is dictated by the requirements of the problem. A wide variety of "building blocks" is available. These proven components are selected and plugged into a common chassis which forms a sub-system producing the required data for a particular application.

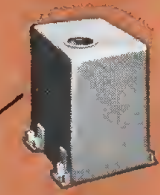


True airspeed positioner



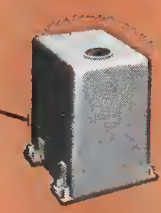
Dynamic pressure positioner

Mach positioner



Jump angle positioner

Angle of attack positioner



Air density positioner

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